Volume 94 Number 1

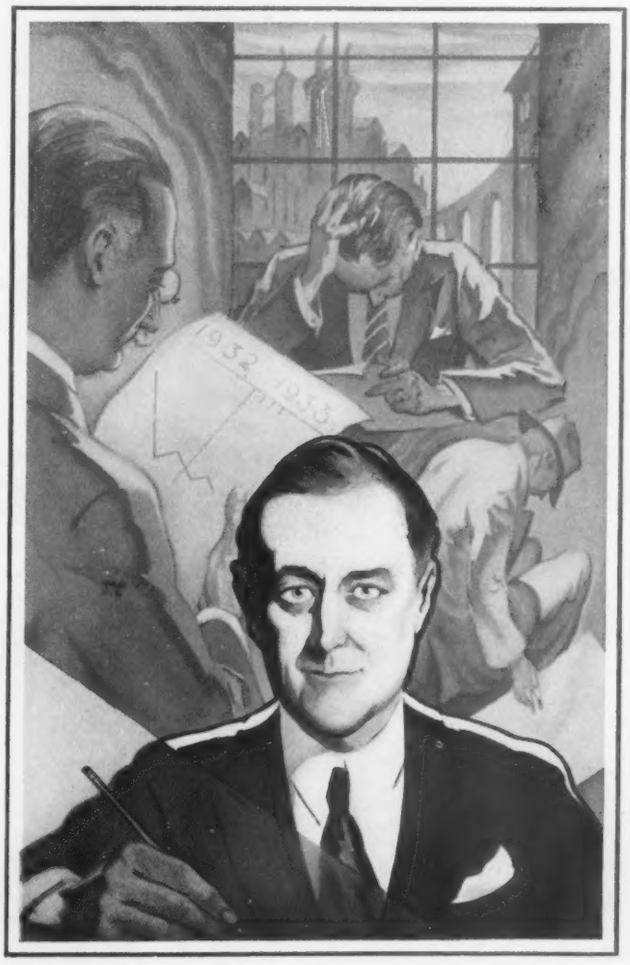
STEEL

For forty-eight Years—IRON TRADE REVIEW

PRODUCTION • PROCESSING • DISTRIBUTION • USE

The Year in Perspective

WHEN the historian of the future examines the depression and conducts his post mortem on what now appears to be the first year of recovery, he will require a glossary to unlock the mystery of the initials in which the history of 1933 is written. He will observe that government by alphabet—and occasionally by epithet—began soon after the second Roosevelt was inaugurated president. He will note that through the warp of recovery runs the woof of NRA, PWA, RFC, CWA and other federal agencies which not only poured billions into job-creating projects but also summoned industry to Washington, regimented it and traded price control, immunity to antitrust laws and reformed trade practices for increased employment and payrolls and collective bargaining. And perhaps by this time the historian will have sufficient perspective to determine whether cabalistic government revived industry or merely proved a drag on the natural forces of recovery.



Steel Codified Into 1934

LOOKING into the record of iron and steel, under the national industrial recovery act of June 16 a code was made effective Aug. 19. By the expiration of the 90-day trial period employment had increased 28 per cent and payrolls 32, despite a decline in steelmaking operations from 47 per cent to 44. Unanimously, Nov. 17, the industry requested an extension of the code to May 31, 1934, in which the President and NRA Administrator Johnson were pleased to acquiesce. With the code authority—the American Iron and Steel institute—producers filed minimum prices and firm extras . . . . During 1933 Robert P. Lamont resigned as president of the Institute, Charles M. Schwab remained chief executive officer, and Walter S. Tower was named secretary.

U. S. Steel Rate Gain Is Twice World Comeback

AT HOME under artificial stimulus, abroad under a mixture of private enterprise and government impetus, production of iron and steel flourished . . . . World output of steel ingots and castings, at 65,281,000 tons, gained 31 per cent; pig iron rose 23 per cent to 48,083,000 tons. Five-year-plan Russia climbed to fourth place in steel tonnage and second in pig iron . . . . Up 71 per cent, the United States in 1933 made 23,076,000 tons of ingots and castings, while the improvement in pig iron, slightly less at 58 per cent, was to 13,083,000 tons. Thirty-five per cent of the world's steel and 27 per cent of its pig iron originated in the United States. . . . . In point of per capita consumption of steel last year, Belgium-Luxemburg led with 418 pounds, the United States was next with 410, followed by Great Britain,

NIRA PASSED — JUNE 16
NIRA
'CENTURY of PROGRESS' — MAY 27
STEEL HEARING — JULY 31
?
74¢
93¢
$1.00
U.S. WENT OFF GOLD STANDARD APRIL 19
PRESIDENT SIGNED STEEL CODE - AUGUST 19
BEER LEGALIZED MARCH 27
STEEL RAIL PRICE SETTLED OCTOBER 30
EPIDEMIC OF STRIKES SEPTEMBER — OCTOBER

302; France-Saar, 301; Germany, 233; Russia, 107; Italy, 94; and Japan, 45. In 1932 Great Britain led, and the United States was second.

Most New Capacity Is for Flat-Rolling

THIS 71 per cent increase in the output of steel and 58 per cent in pig iron in 1933 was achieved with negligible enlargement of equipment. For the fifth successive year no blast furnaces were undertaken or completed, and for the first time since the armistice no by-product coke ovens were constructed. Four open-hearth steel furnaces, with an aggregate annual capacity of 246,400 tons, were completed, compared with none in 1932. Two furnaces were large 150-ton ones at the Great Lakes division of the National Steel Corp. at Detroit; the other two at Granite City . . . . It was on finishing capacity that the industry concentrated, especially for rolling and finishing flat-rolled products—sheets, strip and black plate—in coils. The trend toward 4-high mills for cold-rolling strip for tinning was marked.

Autos and Cans the Atlas of Steel World

ONE out of every five tons of steel rolled last year went to the automotive industry, and one out of every nine to the food and packing industries in the form of containers. Breaking down the flow of steel from the mill to the consumer in 1933, the automotive classification led with 20.95 per cent, second was containers at 12.25, a close third was buildings at 12.18, fourth were the railroads at 8.04, fifth the oil, gas and water classification at 4.88. Among the smaller groups, the machinery industry consumed 3.63 per cent, exports 3.61, and agriculture 3.01. Except that containers forced buildings from second place, the order of consumers was unchanged from 1932. Automotive consumption of finished rolled steel for the year is indicated as 2,879,660 tons, containers 1,682,000 tons, building 1,672,334 tons and the railroads 1,105,417 tons.

Monthly Shipments Succeed Unfilled Tonnage

A LANDMARK of 32 years standing, dating back to formation of the United States Steel Corp., fell a victim to NRA and progress in November when monthly reports of Corporation unfilled tonnage were discontinued. The steel code requiring contracts to be shipped within a quarter or canceled, unfilled orders lost their barometric value and were replaced by actual monthly shipments . . . . Almost as radical were two developments in shipping. Pittsburgh Steel Co. in March dispatched the first all-water shipment from Pittsburgh to the Pacific coast; Inland Steel Co. in May made the first shipment of steel by water from Chicago to Mississippi river points . . . . When southern California was racked by earthquakes in March, the safest place was in a steel-frame structure . . . . Steel became safer for the investor in 1933 when a gradual ascent out of "the red" began. For all 1932 the average loss per ton of ingots produced was $12.33. In the first quarter of 1933 the deficit rose slightly to $13.70 per ton, then tapered to $2.86 in the second and to only 42 cents in the third quarter.

Producers Reach Out for New Markets

IF NECESSITY is the mother of invention, then depression is the father of new markets. With the return of beer, a score of manufacturers turned to the manufacture of beer barrels, both carbon and alloy steel . . . . Rotary Electric Steel Co. completed its plant at Detroit for making steel in the electric furnace and casting it in rotary molds . . . . Columbia Steel Co. started to roll full finished sheets at Torrance, Calif. . . . . Inland Steel Co. brought in its new tin mill at Indiana Harbor, where Youngstown Sheet & Tube Co. doubled its tie plate capacity. It also entered the alloy field . . . . American Rolling Mill Co. launched into the stainless steel market . . . . United States Steel Corp. subsidiaries announced development of a stainless clad steel; these subsidiaries also featured addition of titanium to 18-8 steel . . . . National Tube Co. was licensed by Diescher Tube Mills Inc. for a new type of tube mill.

Modernize Methods More than Equipment

TECHNICAL advances in the iron, steel and metalworking industries were restricted by the cumulative effect of three poor years upon financial reserves, natural emphasis being upon the attainment of economy by modernizing existing facilities and devising improved methods . . . . At blast furnaces, slow blowing gained converts, and costs were further reduced by beneficiation and conversion of materials . . . . Lower costs in open-hearth departments were effected by closer control of iron oxide and insulation of furnaces . . . . Mechanically-equipped cold mills for strip and tin plate featured the rolling mill industry . . . . Improved methods for welding stainless steel and aluminum led progress in welding . . . . In heat treatment, application of controlled furnace atmospheres for bright annealing, surface hardening and prevention of scaling was expanded . . . . Foundries concentrated their research on development of alloy castings for high temperatures and corrosive service . . . . Through semirefractory insulating brick, manufacturers of refractories contributed to fuel savings and more uniform operating temperatures.

NRA Cancels Early 1933 Wage Reductions

LABOR opened 1933 weak, but closed it strong. A New Year present to Frick Coke employes was a 10 per cent reduction; American Bridge and McClintic-Marshall cut 25 per cent on Jan. 30; United States Steel Corp. shaved 10 per cent

off salaried employes' time and income April 1. But the tide turned when the recovery act, with its famous section 7a on collective bargaining, was signed June 16. Allegheny, Continental and Andrews led in putting up wages, and by the time the iron and steel code was filed in mid-July a 15 per cent advance in wage rates had become general . . . . Armed with section 7a, organized labor invaded steelworks in the late summer, contesting with company plans the favor of workers in organizing. Adoption of company employe representation plans became general . . . . Becoming exceptionally aggressive at plants of the Weirton Steel Co., a strike was called Sept. 27, to be settled by intervention of the national labor board. When, however, Weirton resisted the board's attempted usurpation of authority over an election of employe representatives Dec. 15, Washington became agitated . . . . Labor at "captive" coal mines of iron and steel producers in western Pennsylvania was troublesome, but quieted after elections for collective bargaining were held.

Few Mergers; Several Plants Are Closed

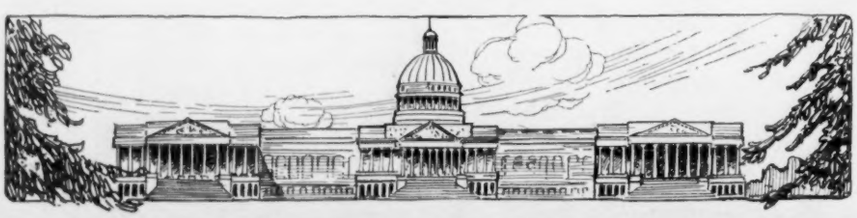
FOLLOWING the shakeouts of 1930-32, business relationships were comparatively tranquil last year. American Steel & Wire Co. discontinued its Morris & Bailey division at Pittsburgh and turned its Alabama properties over to Tennessee Coal, Iron & Railroad Co. The Steel corporation closed its Canadian plant at Ojibway. Empire Sheet & Tin Plate Co. became successor to the Empire Steel Corp., with the W. H. Davey Steel Co. formed to acquire the former Empire mill in Cleveland. Carnegie and Illinois Scully warehouses were merged as the Scully Steel Products Co. S. R. Dresser Mfg. Co. absorbed the Bryant Heater & Mfg. Co. Combustion Engineering Co. was organized to acquire International Combustion properties.

Many New Presidents Are Appointed

RECONSTRUCTION of personnel of the Steel corporation, started late in 1927 when the Taylor regime took hold, was practically completed in 1933 when C. W. Bennett succeeded E. W. Pargny as president of American Sheet & Tin Plate Co., Robert Gregg became president of the Tennessee company on the retirement of H. C. Ryding, William J. Filbert was made chairman of the finance committee, and E. R. Stettinius Jr. vice chairman. Ralph H. Watson and R. E. Zimmerman became Steel corporation vice presidents; James E. Lose, vice president of Carnegie Steel Co.; F. D. Foote was elevated to assistant to vice president of the Steel corporation. When S. P. Ker retired as chairman of the Sharon Steel Hoop Co., Henry A. Roemer became chairman as well as president, and B. E. Kibbee was made executive vice president. H. G. Dalton rounded out 50 years with Pickands, Mather & Co. Promotions to president in 1933 included A. J. Johnston, of Hickman, Williams & Co.; Evans Ward, of Russell, Burdsall & Ward Bolt & Nut Co.; H. S. Beal, Sullivan Machinery Co.; A. E. McKinstry, International Harvester Co.; James Lippincott, West Leechburg Steel Co.; H. D. North, Ferry Cap & Set Screw Co.; Aldus C. Higgins, Norton Co.; N. C. Hurley, Independent Pneumatic Tool Co.; A. A. Fifield, American Fork & Hoe Co., and F. S. Blackall Jr., Taft-Peirce Mfg. Co. C. H. MacDonald became vice president of Colorado Fuel & Iron Co. Willis L. King and C. B. Randall won American Iron and Steel institute medals for 1933.

Iron and Steel Necrology for 1933 Is Long

NOT for several years has death taken so heavy a toll of the industry's leaders. Best known perhaps of old-time steel men to pass were James A. Campbell, chairman emeritus of Youngstown Sheet & Tube Co.; T. J. Bray, former head of Republic Iron & Steel Co., and Col. Henry P. Bope, a Carnegie Steel Co. veteran. Twice was the American Institute of Steel Construction hit, in C. F. Abbott, executive director, and Lee H. Miller, chief engineer. Chicago lost a noted trio, all identified with the World war, in Edward N. Hurley, Charles Piez and Alexander Legge. Other deaths last year included Hugh B. Wick, former chairman of Steel & Tubes Inc.; T. Coleman Ward, president of Hickman-Williams; William L. Ward, chairman of Russell, Burdsall & Ward; Pentecost Mitchell, former head of Oliver Iron Mining Co.; Joseph J. Tynan, vice president, Bethlehem Steel Corp.; W. R. Webster, charter member of A.S.T.M.; Augustine Davis, pioneer in oxyacetylene welding; H. H. Cutler, founder of Cutler-Hammer Inc.; Arthur J. Mason, formerly of Hoover & Mason; and James R. McWane, president, McWane Cast Iron Pipe Co.



Work To Be Done in 1934

EDITORIAL

By E. L. SHANER
Editor of STEEL

ECONOMIC and political events of 1933 metamorphosed industry as completely as if it had been reborn. The change is not apparent in the physical aspects of industry. Outwardly, the furnaces, mills and shops present their usual appearance. But the soul of industry—the thinking of its executives—has undergone a striking transformation.

A year ago a pronounced attitude of futility pervaded executive offices. The feeble upturn in the fall of 1932 had petered out in the fog of election uncertainties and the mouthings of a lame duck congress. An administration defeated at the polls held the reins of government.

Then—almost simultaneously with the inauguration of a new President—came a crisis so threatening to the very life of the nation that every citizen was united in common bond to the cause of preservation and recovery. Under the conditions of an emergency seldom experienced in this country except in time of war, the American people bestowed extraordinary powers upon the new Chief Executive.

These powers—mostly permissive—enabled President Roosevelt to introduce the "new deal," a potent mixture of recovery stimulants and reform medicines. The Roosevelt philosophy, as analyzed thoroughly elsewhere in this issue, contemplates the curbing of the traditional prerogatives of industry and the granting of greater license to employes, farmers and others.

Industry first experienced the practical application of this philosophy in NIRA. This hastily written legislation, with its ambiguous Section 7a, gave pause to the leaders of industry. Many denounced it roundly. Others accepted it provisionally. Still others grasped it blindly as a means of release from the starvation of cut-throat competition.

SIX months have passed since the real import of the "new deal" was revealed. The basic steel industry and the majority of its affiliated groups are codified under NRA. Thousands of company executives have participated in the preparation of codes, attended hearings, conferred with administrators, clashed with union labor representatives, debated with spokesmen for consumers, and dealt with numerous other interests.

Through these extensive and varied experiences, leaders of industry have acquired broader viewpoints. They visualize the position of industry in the economic and social fabric of the nation more clearly. They feel the power of public opinion, recognize the value of public good will and realize that the traditional ostrich-like policy was not the correct approach to public understanding. Moreover, they are awake to the efficacy of enlightened management for individual companies and responsible, forward-looking leadership for industrial groups.

Nothing short of the jolt which jarred business in 1933 could have rekindled the fires of initiative and courage so quickly. Nothing less than the combination of financial panic, liberal government policy and public criticism could have spurred industry to the cyclopean effort it has manifested in the past half year. And nothing short of the emergency thus created could have changed executive thinking or developed leadership in industry so effectively.

THIS broader viewpoint, this new leadership and the new community of purpose among competing companies to protect their common interests against aggression from outside are priceless benefits derived by industry from the melee of 1933. They are the weapons with which industry faces the problems of the new year.

What are these problems?

Foremost, at the start of the year, is the immediate problem of continuing to iron out difficulties of operating under code provisions. This involves not only the functioning of code authorities, but also the management routine of the individual companies. Also it means long-range planning, which will insure for industry

the retention of the good in NRA. Likewise, it demands constant vigilance against the unwarranted attacks of industry's enemies, some of whom through ignorance, fanaticism or pure malice, would destroy it if they could. In other words, industry must "sell" itself as well as its products.

Under the opportunity created by NRA, the steel industry adopted a new price structure. Insofar as it approaches the ideal of an open-price policy, it is desirable. However, the new system is encumbered with certain features which may not work out in practice. The inflexible rules which concentrate releases of tonnage in one period and starve the mills at other times probably will require revision. The age-old problem of the single price is far from settled. The remarkably fine work on extras must be continued, with constant attention to inequalities as they are revealed.

These and other refinements of price policy are on steel's agenda for 1934. The new leadership of the producing industry should work to the end that every step of progress in the solution of the price problem be held, and that under no circumstances should steelmakers be permitted to go back to the old practices of waiving extras, granting hidden concessions and indulging in other forms of discrimination.

ANOTHER problem confronting industry is that of labor relations. Fundamentally, nothing was seriously at fault in the relationship of the majority of employers with their employes. In fact, by virtue of the closer bond created by adversity, management and workers probably understood each other better at the beginning of 1933 than at any time in many years. Industry's exposure to criticism for its labor policies was due more to its own failure to publicize the real facts regarding the labor situation than to faulty treatment of employes.

In 1934 industry should proceed without delay into a program of ideal labor representation, accompanied by an effective campaign to familiarize the public with its policy and its objectives. This is no more difficult than the task of ridding industry of its reputation for hazardous occupations—a job superbly performed through an intensive safety campaign many years ago.

MERCHANDISING should receive far more attention in 1934. The provisions of codes place emphasis on quality and service, and remove the price factor from its former position of dominance. Moreover, the trend in steel consumption is toward markets where selling rather than order-taking is an important requisite. Alert managements have discovered that the best tonic for impaired morale throughout an industrial organization is an efficient hustling, intelligent merchandising staff.

Several companies already have caught the spirit of better merchandising. Their identity is revealed in the buoyancy of their sales personnel. Executives throughout all branches of the iron and steel industry can select no activity of greater opportunity in 1934 than that of rejuvenating and modernizing their merchandising staffs.

In brief, 1934 calls for clear thinking and decisive action, attuned to the tempo and the environment of the present and not predicated too much upon methods which proved effective under conditions of the past.

Recovery a Fact, Reform Is Next on Agenda of the 'New Deal'

See Social Aspects of Roosevelt Program Emerging in 1934, Perhaps Overshadowing Gains in Business

BY E C BARRINGER
Managing Editor, STEEL

IN HIS strong and inspiring inaugural address last March, by the exigency of the times devoted to business, President Franklin D. Roosevelt advanced a four-point program. He pledged action, leadership, recovery, and reform —the latter two, of course, with special reference to business.

Action he has stimulated and leadership he has provided aplenty. Concerning the quality and objectives, opinions vary according to shades of social thought and economic approach, but there is no contradicting that he performed almost a miracle in speedily restoring the morale of the nation.

While mounting apprehension over a Democratic regime contributed to the confusion, the President nevertheless quelled a social as well as a financial panic, and his command of congress and his readiness with a plan—almost any plan would have sufficed—lent confidence that the government was not impotent and that the depression would be combated instead of being permitted to grind itself—and a people—out.

So far as action and leadership are concerned, the President has delivered.

Between recovery and reform the President wavered all year, not in weakness but rather in the manner of a rider straddling a pair of spirited horses. "The brain trust," "the professors" and other academic minds having easy access to the White House pulled hard to the left, disposed to punish business punitively and categorical that the time to recast business was when it was prostrate.

More practical advisers, greatly inferior numerically and almost in disrepute at times, exerted a force to the right, contending that the immediate task was recovery and that the short-range emergency of relieving unemployment and restoring activity should not be complicated by the long-range objective of overhauling business.

First giving one "horse" the rein and then the other, the President skillfully spurred both on, meanwhile striving to maintain some semblance of balance between them. In mid-year, when NRA was launched, the left horse spurted and threatened to throw the President, but recovery rallied and pulled up.

Unquestionably, the recovery process was started in 1933. In iron and steel the measure of it was a 71 per cent increase in the output of steel ingots and 58 per cent in pig iron. Business last year pulled out of the slough of depression and came up to the new year genuinely confident.

So, the left wing at Washington is correspondingly emboldened to urge upon the President that, having also fulfilled his third pledge—recovery—he proceed this year to his fourth and final point—reform. In other words, the patient having responded to emergency treatment and being reasonably certain to live, the time to reset his arms and legs is before they knit.

Assuming that the recovery process continues, the keynote of Washington in 1934 will be reform.

TO A degree surprising for a man in so high an office, the President is frank and forecasts his movements long in advance. On taking the oath of office he said:

"The money changers have fled from their high seats in the temple of our civilization. We may now restore that temple to the ancient truths. The measure of the restoration lies in the extent to which we apply social values more noble than mere monetary profit."

These few words sum up the creed of the Roosevelt administration—the temple to be restored to the ancient truths and social values to be reckoned more noble than mere monetary profit. The foundations having been salvaged in 1933, the superstructure is to be rebuilt in 1934.

A year ago when, truth be told, business had

virtually abdicated, the Moleys and Berles and Tugwells were for completely taking over the site and erecting an entirely new temple of business. The keynote was to be the elimination of the profit motive, leading ultimately to the destruction of private ownership.

When business was approaching a state of demoralization in the dark days of March and April, these radical minds were eager for the President to impose this new sovereignty by presidential fiat.

But the recovery of business in the past year and the moderating influence which always accompanies power shift the danger from force to peaceful penetration. In the meantime, Secretary of Labor Perkins has forged ahead rapidly as an advocate of social reform.

In business there are three communities of interest—labor, the consumer, and management-shareholders. Weighed in the scale of social values of present-day Washington, they rank in the order named.

In setting up NRA codes last year, labor was the prime concern, consumers were secondary, shareholders were ignored. The formula of restricting hours and increasing wages in advance of improvement in demand violated all economic precept.

Ask President Roosevelt and NRA Administrator Johnson what was the greatest achievement of NRA in 1933 and they will chorus: The elimination of child labor in the textile industry.

These maximum hours and minimum wages of NRA codes are, however, only a springboard for the future. Organized labor is pointing unmistakably to the 6-hour day, 5-day week. If business continues to improve in early 1934 and unemployment to diminish, the 30-hour week issue will be deferred, but it is inevitable.

And with this still shorter workweek the corollary is an adjustment of wage rates retaining for workers substantially the present aggregate weekly payment—a further encroachment of the wage factor into the profit area. For the emergency, Washington has acquiesced in moderate increases in prices to consumers, but this toleration is likely to end when 1926 commodity levels have been regained.

But a 30-hour week is only a minor phase of the labor program. Secretary Perkins, who on the socialization of business most faithfully mirrors presidential thinking, proposes:

Unemployment insurance frankly calculated to threaten such a drain on business that the avoidance of depression and payment of unemployment benefits will become the first concern of management.

Old age pensions.

Greater safeguards for healthy and safe working conditions and increased workmen's compensation.

Free public employment exchanges.

Standard minimum wages for women.

Organization of all classes of labor for collective bargaining.

In fact, the vision of the department of labor is the reduction of profit, through increased remuneration and benefit to labor, to a very thin veneer.

In a quiet but effective manner the department of labor is now coordinating the action of the states in these matters and promoting their adoption. A conference has been called in Washington for late January to effect this.

The most intensive study of the operation of labor provisions of NRA codes is being conducted by Secretary Perkins, with the objective of making permanent the best labor features of codes and eventually offering congress a program based upon the experience of the states.

Such reform, of course, is direct-line aid to labor. Even its advocates expect only a small portion of this program to mature in 1934, but agitation for it will increase and the threat of it overhang business. More actual reform may be accomplished this year in oblique fashion.

PUBLIC Enemy No. 1, according to the Roosevelt administration, is banking. The guarantee of deposits made effective Jan. 1 introduces the most revolutionary element in banking in modern times. What labor does not realize is that it pays for this insurance or guarantee in the form of a reduced rate of interest, paid on deposits.

Financial reforms which the President is expected to recommend to congress include federal incorporation of security exchanges, government representation on the governing boards of exchanges, full pub-

licity concerning all syndicates and pool operations, a prohibition against syndicate speculation by officers and directors in securities of their own corporations, and increase in the minimum margin for speculative trading to possibly 50 per cent, and only minor—if any—modification of the securities act of 1933.

Apart from any inherent merit in these proposals, the inevitable sequel will be to increase the timidity of private investment in the capital or durable goods industries, whose revival admittedly is essential to genuine recovery.

The government already is deeply in the banking business, RFC now owning some percentage of the capital stock of 2443 banks, having a total investment of $627,000,000, and an extension of RFC beyond the present limit of its existence, Jan. 23, will certainly provide additional funds for this kind of investment.

The effect is to give the government a lien on private banks and complete knowledge of all transactions with business. Only time will reveal the extent to which political pressure will be exerted through these holdings, but the government sitting as a partner, and not necessarily a silent one, insures the reconstruction of the banking industry.

Direct loans to individuals or businesses, making Uncle Sam a pawnbroker, to use the phrase of former President Hoover, constitute a new policy likely to be authorized this month. The very mention of the possibility has elicited almost 3000 applications for loans, most of which normally would have been supplied through channels frozen by government policies themselves.

But banking is only one of many "key" industries to feel the heavy hand both of government reform and government competition. High up on the list is the President's pet anathema—the power industry.

Development of the Tennessee valley and of the Grand Coulee project in the Pacific Northwest is not only an attempt at a social regeneration and upbuilding but also a threat at private power interests within a radius of hundreds of miles from the heart of these projects.

Transportation To Be Rationalized

Under TVA Director Morgan, the Tennessee valley is being used as a vast social and economic laboratory. Paternalism will go the limits of financing even the sale of electric appliances to provide an outlet for power. Both the Tennessee valley and the Grand Coulee power units ultimately will dwarf Muscle Shoals and Boulder Dam and be in direct competition with private interests.

Along with banking and the power companies, the railroads also are to be "shopped," regardless of any improvement in traffic this year. The co-ordination of rail, highway and air facilities in an endeavor to place each in its most remunerative and helpful groove, more strict regulation of highway transport services, abandonment of competing parallel railroad facilities, with the consequent upset of labor and buying facilities, are on Railroad Co-ordinator Eastman's agenda.

Not for nothing has the federal trade commission begun assembling salary data of all corporations rated at a million dollars or more, following the suggestion of NRA in revising certain codes that salary limits be imposed on executives and the undisguised policy of RFC in making reductions in salaries a condition for receiving government loans.

Not all of this reform will be consummated in 1934 nor will all of it be detrimental; with many phases, business itself will be in accord and will welcome leadership to accomplish from without what was impossible to effect from within.

But over the year the various lines of business reform will expand and begin to converge into an alarmingly increasing concentration of authority in Washington and socialization of major industries, with the object of making them more subservient to labor and the consumer than to management.

Obviously, the net effect will be to increase uncertainty, raise operating costs, make labor less tractable and in general create an atmosphere of unsettlement.

REFORM costs money, indirectly. Relief is a direct burden. In Washington's present temper it is easy to guess who will foot the bill for both.

Budget Director Douglas has warned that the middle class will be taxed almost out of existence to pay for the depression. Coming from a man who is accounted a conservative, that is ominous.

The young radicals and the socially-minded of the administration, having taken a slice off the bottom of business for labor, see it equally easy to take a slice off the top to meet the

deficit which emergency relief is piling up.

In round numbers, by the close of 1933 the "new deal" had cost the nation fifteen billion dollars. Billions becomes a careless phrase when gaged by social values. Said Harry L. Hopkins, federal relief director, "the business of the government is to look after human beings."

This fifteen billion breaks down into ten for loans and five for outright expenditures. Part of the ten is expected to be returned eventually by the banks, railroads, home owners, states and other borrowers, but the salvage will be far from 100 per cent, to say nothing of administrative expense. Of the three billion for public works, for example, at least 30 per cent is not repayable.

Estimates of the government's requirements for relief expenditures, about to be sent to congress by the President, range up to four billion dollars. Mark that these billions are for use beginning July 1, 1934, and indicate the extent of relief expected even after a half year which is cloaked with noteworthy confidence for improvement.

Meanwhile, the national debt is mounting, and also the service on it. Increasing at the rate of a half billion dollars a month recently, the debt at the close of 1933 was practically $24,000,000,000. This compares with the all-time high of $25,842,000,000, in 1919.

At the present rate of increase, this high water mark after the World war will be passed in the early spring, and there are not a few in Washington who visualize a national debt of thirty billions.

No Outlays Without Revenue

The device of an extraordinary budget for depression-combating expenditures may enable the administration to conclude the fiscal year ending next June 30 with its normal budget balanced, but extraordinary expenditures nevertheless must have their equivalent in revenue unless unsound money, a breakdown of government credit and national insolvency are to be the sequel.

Bitter as some of the attacks upon the President's monetary views have been, he still stands as a sound money man, relatively speaking. Thus far at least he has been a middle-of-the-road man as regards money. He has pleased neither the advocates of gold nor the inflation group, but has given every indication of standing against unbridled inflation.

So eminent an authority as Edwin W. Kemmerer, Walker professor of international finance at Princeton university, concedes that return to the old gold standard is impossible, and urges stabilization of the dollar on gold at the rate of 66 2/3 cents.

Last spring, prior to the London economic conference, the President declared that he would not stabilize the dollar with regard to the pound or the franc until domestic commodity prices had been lifted to about the 1926 level. Most predictions concerning stabilization rate the dollar at between 50 and 66 2/3 cents.

Having successfully repudiated the government's word to redeem its securities in gold, the administration is reported to be toying with the idea of corralling the gold in the federal reserve system and taking the profit on it when the gold content of the dollar is officially reduced.

In the treasury and the federal reserve system is gold valued at about four billions on the old basis, and a 50 per cent devaluation of the dollar would automatically increase the value of this reserve to eight billions.

To Plug Holes in Tax Laws

While this would mitigate the burden of the national debt, nevertheless increased taxation is inevitable. For the reason that the elimination of the bootlegger will be as much an objective as raising revenue in the taxation of liquor, the maximum revenue now seen from liquor is $300,000,000 a year. This sum will practically offset the special taxes in effect the past year to amortize public works expenditures and automatically terminated by the repeal of prohibition.

A tax program, formulated by Acting Secretary Morgenthau, will probably go to congress in a few days. Liquor taxes will be the first order of business; plugging loopholes in the present income tax as a result of disclosures through the Pecora investigation may be second.

Though nothing is likely to come of it at the present session of congress, an entirely new basis for taxation is being worked out by the young radicals. The latter are sensitive to new social currents created by the depression, typical of which is the recent recommendation of Protestant, Catholic and Jewish church leaders that a confiscatory tax be levied on wealth. One typical religious utterance is:

"In the present emergency, the government has not only the right but the duty to conscript income and wealth. Unless we agree to redistribute the income of the country justly through law and a new and radical system of taxation we have every reason to feel that the income and wealth will be seized and redistributed through violence and riots, bloodshed and civil strife."

A fresh drain upon the treasury, with business presumably called upon to meet at least the carrying charges, is the prospective requirement for fourteen billion dollars for reviving the construction industry. A conservative study has developed the conclusion that if the construction work in arrears because of the depression and normally developing in the next two years were to mature in 1934 and 1935, it would total $14,104,000,000.

This includes housing, public works, highways and transportation, and industry—about four times the extent of the present public works program—the great bulk of it to be government financed.

There is no gainsaying the enormous benefit that would follow a large construction program. One builder (the Austin Co.) recently checked a factory construction job costing $450,000 and determined that $402,280 was paid for skilled and unskilled labor, representing 805,310 man hours, or more than 115 7-hour days for 1000 men. Thirty states benefited from the purchases for this job.

Increased taxation at the present session of congress probably will be effected through a tightening-up of present levies, plus new imposts on liquor. A revised basis for taxation will probably be formulated by the administration this year and perhaps laid before congress at an adjourned or special session held later in the year.

IN THE manner of the ancient Arabian proverb concerning the camel, NRA in 1933 merely got its nose into the tent of business. Whether the tent is big enough for both is likely to be determined in 1934.

Last year was merely a formative one for NRA. The recovery act was signed June 16; the first code (cotton textiles) was made effective a month later; the iron and steel code was approved Aug. 19 and extended on Nov. 17 to May 31, 1934. The Dec. 20 roll call showed 175 codes approved, hearings held on 277, hearings scheduled on 52.

By the end of January it is expected that between 300 and 350 codes will be in effect, blanketing about 70 per cent of all industrial labor. The original objective of NRA was to return 3,000,000 men to work directly and another 3,000,000 indirectly, but the broadest claim in Washington is that 4,000,000 jobless have found employment either through codes or work projects.

Superficially, 1934 looks like a tranquil year for the major codes with which iron and steel is concerned. Its own code stands unchanged to May 31; that of automobile industry to Sept. 5; the construction code, shortly to be born, should stand through a half year at least.

Unless repealed or amended the recovery act is the law of the land until June 15, 1935, and neither the

(*Please turn to Page* 102)

Better Merchandising Is Need in 1934

TWO important factors will force intensive and intelligent merchandising to the front in 1934. The immediate factor is the influence of steel's code of fair competition, which tends to reduce the potency of price cutting and to accentuate the importance of quality and service. The second, a long-term factor, is the unmistakable trend in steel consumption away from the "easy" big tonnage markets and toward the markets where real merchandising is required to book an order.

That the management of the steel industry is aware of the shift of emphasis from production to consumption is indicated by the majority of personnel changes in the past year. A casual survey of the appointments of new executives will show that a large proportion of the revampings of official rosters was dictated by the necessity of infusing new blood into merchandising organizations which had failed to keep pace with the times.

WITH the price factor submerged, steel producers will be forced to use other sales arguments. The trend will be toward the development of applications for steel.

That there are vast opportunities for improvement in this direction is evident to anyone who has studied the consumption of steel by typical fabricators and users. In many instances the buyers are poorly informed on the properties of the steel they use. Frequently a salesman who is not too intent upon the price factor, is able to obtain business by showing the user the appropriate steel to meet his purpose.

Likewise alert merchandising organizations will be studying new applications. One of the most successful producers has developed a technique for tracing every new application of steel. By carefully following up such applications, this company has developed a number of important new sales outlets.

Intelligent merchandising of this order will be more prevalent in 1934. The day when a company could depend largely upon reciprocal relations and the easy flow of orders from car and locomotive builders, agricultural implement makers and others, is passing. In the future more and more of the steel sold will be in smaller lots, of more exacting specifications and better suited to the particular need.

Illustrations of the need of better merchandising are found in all of the important consuming groups. In those which are discussed in this article it will be noted that demand in 1934 will depend upon two factors—first the volume of business in the consuming field (which is a factor beyond the control of the steel supplier), and secondly, the changes in methods, designs, etc., which influence the use of the material.

Railroads

This will be illustrated in the railroad field. It is believed that the outlook for purchases of ordinary steel for cars, locomotives, track maintenance, etc., in 1934 will be better than in 1933. One authority expects that at least 50,000 freight cars will be placed during the coming year. *Railway Age* estimates that expenditures of the railroads for maintenance of their equipped permanent way and structures have declined from 1930 to the present by a cumulative total of about three billion dollars under the average annual outlay for the years 1925-29 inclusive. This authority states it will be necessary to spend about $700,000,000 to restore the chief properties of the railroads to the standard of physical condition enjoyed at the close of 1929.

But it would be a mistake to assume that the only business available from the railroads is that which will be afforded by maintenance and replacement of standard equipment. At last the roads are experimenting with lighter equipment. Some of the more progressive lines are becoming "weight-minded." The stream-lined trains, light weight suburban cars, and other innovations of the past year show that transportation is in a state of flux.

Here is an opportunity for steel producers to demonstrate real merchandising. The steel industry waited for the automobile builders to tell them what they wanted. Motor car manufacturers practically dictated their needs. Would it not be wise for the steel industry in the approaching era of radical changes in rail transportation to take a more active part in developing the proper applications of steel to the new needs? To do so would insure the continuance of steel in this important market and protection against the encroachment of competing materials.

Canning Industry

Outstanding as the banner product of the depression period is tin plate. Its showing is attributed to the continued brisk demand for tin plate for the food and packing in-

The outlook for steel consumption in 1934 *in the petroleum industry is promising, particularly in the refining and distributing departments*

dustry and for containers of all kinds.

"Present prospects for the can-making industry in 1934 are bright," declares O. C. Huffman, president, Continental Can Co. Inc. "There is likelihood that plantings will be increased and canning activity stimulated, conditions which in the past have usually followed a marked decline in the supplies of canned foods in canners' and distributors' hands. This condition currently exists, authoritative estimates putting these stocks at considerably less than those of a year ago."

Petroleum Industry

In the field of the petroleum industry lie important outlets for a wide range of steel products and developments of the past year point only to an increasing need for steel, all the way from the refinery to the ultimate merchandiser of petroleum products.

A development of the past year, the packaging of oil in tin cans for service station sale, and now widely adopted by leading oil companies has contributed in important measure to the increased production of tin plate.

According to the president of Continental Can Co. Inc., the use of non-refillable cans for motor oil will expand even more rapidly in 1934 than during the last six months of 1933 when these containers were first used by oil refiners. He states that since its introduction the consumption of canned oil has been increasing rapidly.

"Sales of canned oil," he points out, "are still only a small part of the 2,800,000,000 quarts of motor oil estimated to be consumed annually by motorists in this country. The field offers the can-making industry possibilities of large expansion and is one of the many new developments in the industrial or general line use of tin containers which tend to give increased diversification and stability to the industry."

The super-service station, a comparatively recent development, is receiving further impetus in many metropolitan localities and it will not be many years before the old two-by-four corner gas station will be a thing of the past. Steel figures prominently in construction of many, of these new merchandising centers.

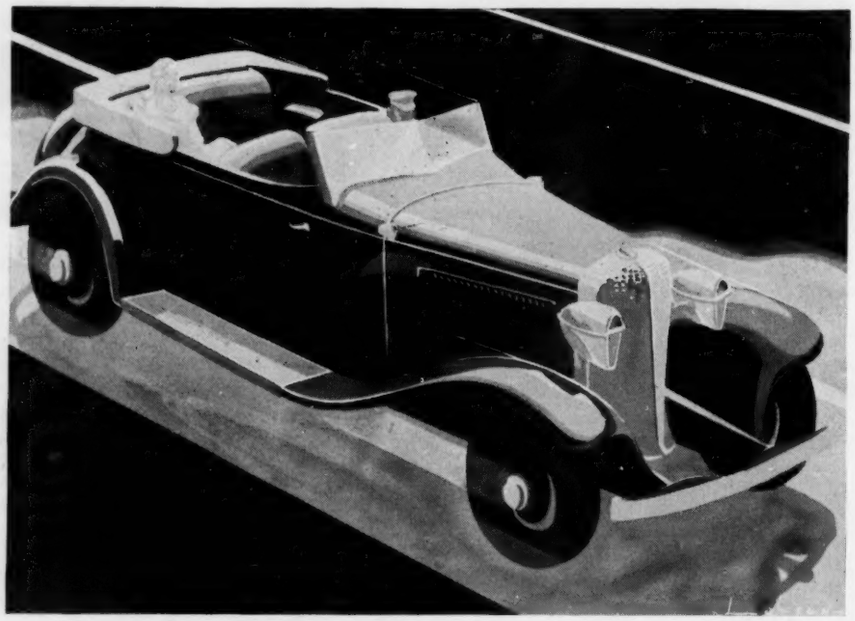
At the turn of the year, the outlook for steel consumption in the petroleum industry appears promising. Demand will be more pronounced in the refining and distributing branches of the industry than in the oil fields and in the transportation of crude.

Automobile Industry

The automobile industry, which in 1933 led all other groups in steel consumption, presents a peculiar market. In spite of the striking manner in which tonnage multiplies when steel is once adopted for a certain part, demand for certain forms of steel for definite applications is decidedly unstable. A steel which today seems to be firmly entrenched as the acceptable material for a certain part in a motor car, tomorrow may be dropped suddenly and another material substituted in its place.

This "in and out" characteristic of steel requirements in the automobile industry is due to a combination of several engineering and economic factors. One of these is the influence of style, which is responsible for frequent changes in design. The tendency toward streamlining, which is noticeable in 1934 models. will tend to increase the weight of steel per car. The changes in spring suspension adopted by several manufacturers probably will not markedly affect the volume of steel consumed, but it will change the forms of steel required. Heavier frame construction seems to be indicated. On the other hand the steel industry is losing some tonnage through the adoption of cast camshafts and crankshafts.

In the main, the outlook in design seems to promise a slightly greater poundage of steel per car in 1934 models. The other factor which will



Two factors influence the steel requirements for the automobile industry—volume of car demand and style and technical changes in design. Both appear favorable to steel in 1934

influence the consumption of steel by this industry is the demand for cars by the public.

The minimum Detroit expects in the way of production of passenger cars and trucks in 1934 is 2,600,000 units, the maximum 3,500,000.

By comparison, 1933 was about a 2,000,000-unit year, notwithstanding the handicaps imposed upon assemblies of new models late in the year by the tool and die makers' strike. In 1932 only 1,370,678 units were built, and in 1931, 2,389,738. Since the 1930 total was 3,355,986, the new year is expected to regain the ground lost in the past two years, and possibly the last three.

To an extent, the first quarter of 1934 was robbed by sales efforts in the last quarter of 1933 predicated upon rising prices for new cars and more conservative values on trade-ins. On the other hand, the strike so delayed dies and tools for new models that December output was disappointing and January will be correspondingly higher.

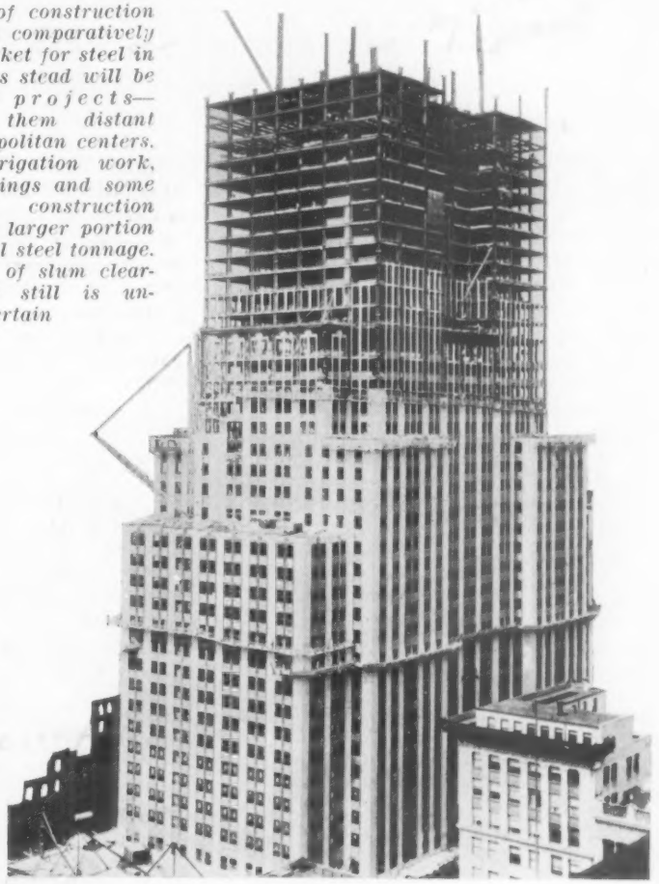
Some 20,000,000 automobiles were in operation at the close of 1933. Of these, at least 12,000,000 were 5 years or more old, and 5 years is considered almost the maximum life of a car, barring a small percentage in excess of that range. In 1929, replacements (production plus imports minus exports minus scrapping) totaled 2,772,000 cars; in 1933 probably less than 1,500,000.

Nineteen thirty-four design, trending strongly toward streamlining, carries with it the possibility of inducing obsolescence on a large scale, similar to that occasioned by the balloon tire and the 4-wheel brake, thereby introducing an artificial factor in favor of large production.

Building, Construction and Public Works

While some gain is expected in private industrial construction, repairs and small plants, the large bulk of structural tonnage in 1934 will be for federal public works and for projects financed by federal loans. There undoubtedly will be a wider distribution of structural tonnage. This is already evident by heavier buying and inquiry for the southwest, Rocky Mountain section and in sections usually accounting for a small part of the structural steel tonnage.

In New York and other cities outstanding tonnage will be reduced in comparison with the total. There will be a minimum of apartment building, limited largely to slum clearance construction. More structural steel will be required for engineering projects furthered by federal loans, dams, locks, navy yards, docks, etc. The Mississippi Valley section and other river ports will get a good part of this tonnage. Bridge and grade crossing work will be heavier and better distributed. Advance of much of this public work depends on the efficiency of state and municipal departments to expedite plans and secure loans. Loans are being granted liberally for definite plans of a needed type of project. Secretary Ickes is doing a good job under tremendous pressure to keep this money out of politics. Delay in the public works program is largely due to the failure of local governments to present definite plans at Washington. There appears to be little likelihood of subway work getting underway again in New York this year, although if the city balances its budget and puts in a real program of economy some money may be made available.



This type of construction will offer a comparatively narrow market for steel in 1934. In its stead will be engineering projects—many of them distant from metropolitan centers. Bridges, irrigation work, grade crossings and some industrial construction will take a larger portion of structural steel tonnage. The extent of slum clearance work still is uncertain

A far greater tonnage of steel and metal will be for municipal water projects in the so-called remote districts. A large increase in the demand for cast pipe and plates for water storage will result. Many of such projects will get under way early in the year. This type of work will require a real volume and it will go to small communities largely. Some of the larger municipalities are in a worse financial condition than the smaller towns and will get less support in comparison.

Briefly it will be a public works and engineering year. There will be no speculative building, but some healthy industrial building expansion. There will be some continuance of brewery construction and tanks, also distilleries. The aggregate requirements for the country will probably be somewhat greater than during 1933—but nothing like the 1928-29 period when New York alone supplied tonnage of 25,000 to 30,000 tons a week. Incidentally some of this steel is not yet paid for.

Among the busiest structural fabricators in the country at this time are independent shops which geographically are in an advantageous position to handle projects distant from the large industrial centers. Many shops of this character are going to be aided by public works. What applies to structural steel is also going to apply to reinforcing steel, especially as to engineering projects.

Closely allied with the building industry is the development of the "steel house." Various types of steel construction received attention at Chicago's Century of Progress exposition. Throughout the year scores of steel frame residences were erected and a number of homes of steel-sided and steel-floored construction were built. Another noteworthy event of the year was the announcement by the United States Steel Corp. that its management believes

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Consumption Ratios of Main Groups

	1933	1932	1931	1930	1929	1928	1927	1926	1925	1924	1923	1922
Automotive	20.95	18.15	14.78	14.10	17.57	17.76	13.34	15.09	14.60	11.37	10.59	8.98
Containers	12.25	10.79	7.90	5.77	4.67	4.56	5.21	5.24	4.20	4.96	3.68	4.16
Buildings	12.18	16.38	16.80	17.80	14.70	15.22	14.89	13.10	15.26	14.44	13.53	11.84
Railroads	8.04	9.09	14.65	16.95	18.44	17.02	20.37	22.81	22.26	27.54	31.02	24.96
Oil, gas, water	4.88	5.50	9.75	9.48	9.01	7.72	8.90	9.29	8.03	8.43	10.60	14.84
Machinery	3.63	3.39	3.37	3.80	3.81	3.48	2.79	2.65	2.69	3.69	2.63	2.83
Exports	3.61	3.31	4.10	4.34	4.83	5.52	5.39	5.29	4.47	5.89	6.22	7.82
All other	34.46	33.39	28.65	27.76	26.97	28.72	29.11	26.53	28.49	23.68	21.73	24.57

MOTOR CARS TAKE FIFTH OF STEEL OUTPUT

Increase Lead in 1933 Consumption of Finished Rolled Steel—Container Group in Second Place

MORE unusual alignments in the ranks of consumers of finished rolled steel appear in the distribution figures of 1933 than in any previous year.

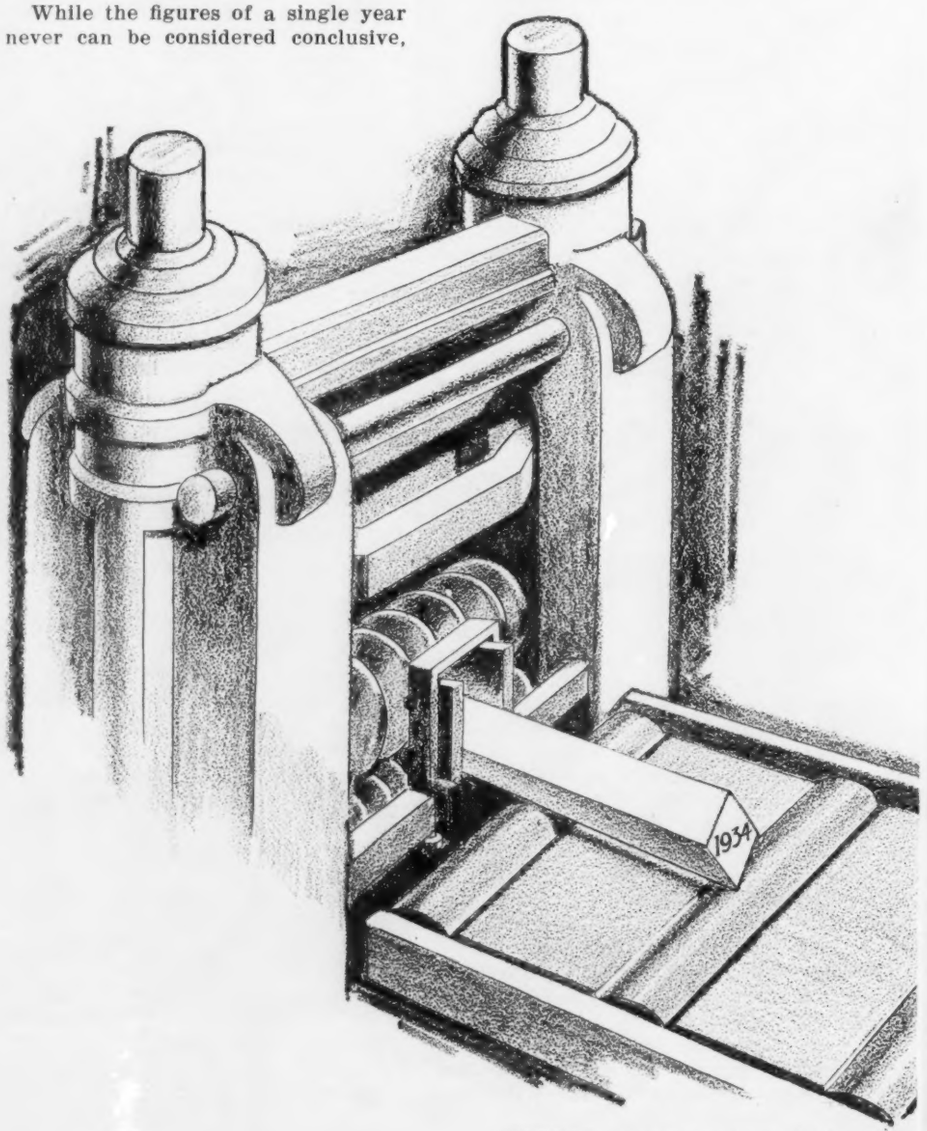
The most noticeable changes are the increase in the lead of the automobile industry in its first place position and advancement of the container group from third to second place. The rise of the container group pushed the depression-smitten building industry into third place. Railroads ranked a poor fourth and the oil, gas and water group retained its position in fifth place.

According to the returns from 86 operating companies, the automobile industry in 1933 took 20.95 per cent of the finished rolled steel output of the country. This is the largest percentage of the total taken by any consuming group since the year 1927.

The ascendancy of containers to second rank in 1933, while due partly to increases in the use of tin plate, was caused also by the relatively poor showing of the building industry.

While the figures of a single year never can be considered conclusive, the rise of the machinery group may be significant of the trend toward the use of rolled steel products fabricated by welding.

An allowance should be made for



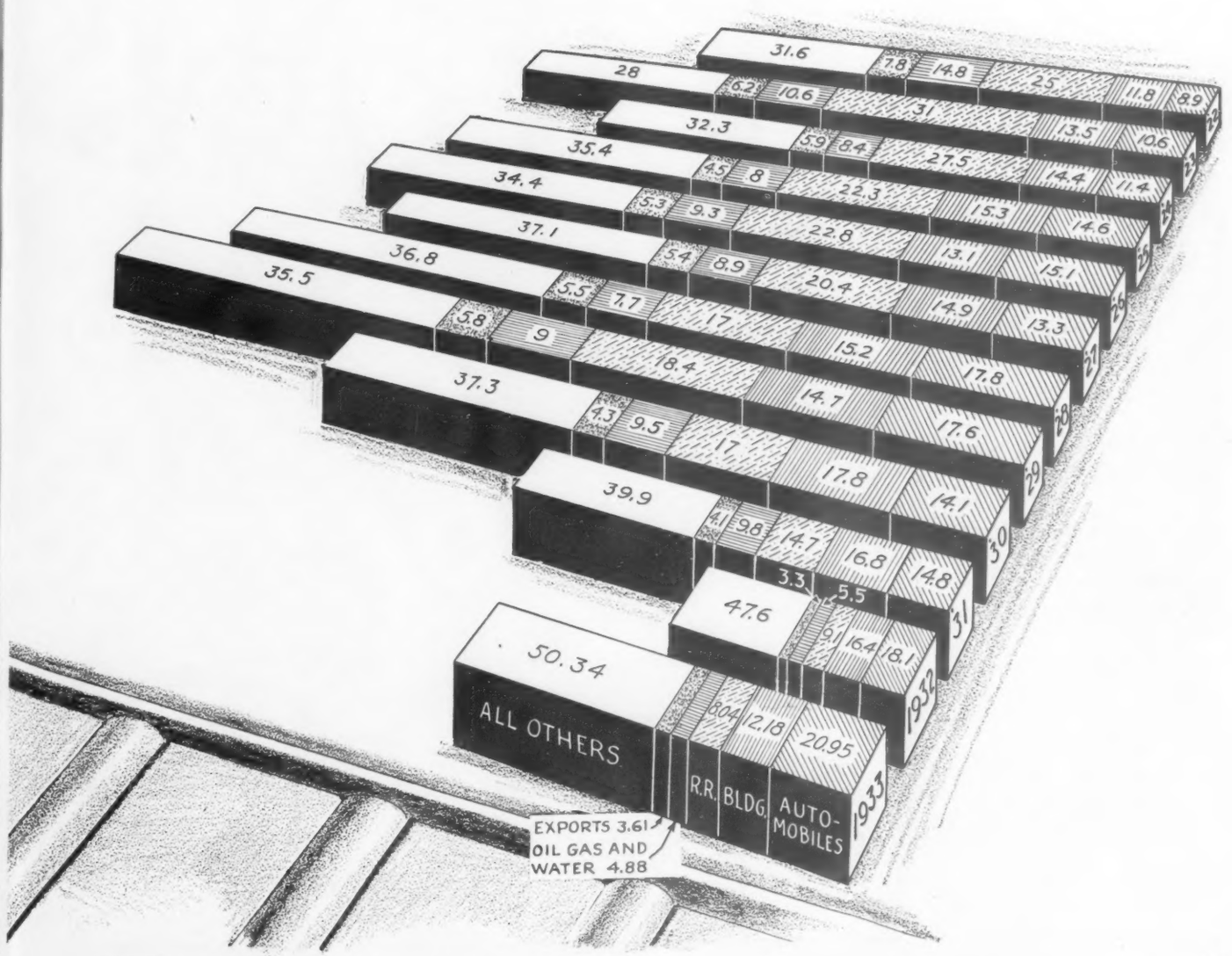
How Steel Ingots Shrink

		Gross tons
Steel ingot production, 1933 (11 months actual, December estimated)		22,776,000
Ingots to forgings direct		200,000
		22,576,000
Loss in conversion, ingots to semifinished (20 per cent)		4,515,200
Semifinished steel production		18,050,800
Loss in conversion, semifinished to finished steel (10 per cent)		1,805,080
Total finished rolled steel		16,245,720
Distribution:	% of total	
Automotive	20.95	3,403,478
Containers	12.25	1,990,101
Buildings	12.18	1,978,729
Railroads	8.04	1,306,156
Oil, gas, water	4.88	792,791
Machinery	3.63	589,720
Exports	3.61	586,470
Agriculture	3.01	488,996
All other	31.45	5,109,279
Totals	100.00	16,245,720

Distribution of Steel in Per Cent to Consuming Groups

Based on 1933 Returns from 86 Operating Companies

	Rails, heavy and light	Angle bars, steel ties and other track accessories	Plates	Structural shapes over 3 inch	Bars, except concrete bars, and shapes under 3 inch	Concrete bars	Hoops, bands or narrow hot rolled flats	Black plate for tinning	All other black plate and sheets except galv. sheets	Galvanized sheets	Strip Steel	Tubing and pipe	Wire products
1—Railroads													
a Cars and locomotives	....	0.95	14.60	4.67	5.34	....	0.33	....	1.28	1.38	1.01	1.60	1.44
b Track construction and repair	80.12	84.85	0.31	0.14	1.29	....	0.11	....	....	....	0.02	0.12	0.58
c Buildings and bridges	0.07	1.04	2.81	6.12	0.69	1.20	....	....	0.02	0.16	0.03	0.05	0.34
2—Buildings													
a Erection materials, framework, trim, etc.	0.09	0.01	17.08	52.39	4.43	34.91	3.40	0.07	1.79	5.59	1.20	2.14	6.00
b Furnishings, furniture, stoves, refrigerators, etc.	....	....	0.19	0.55	2.13	....	4.53	0.47	12.52	9.25	2.53	0.08	4.40
c Other miscellaneous products for buildings	....	....	0.51	0.68	0.16	0.06	....	0.64	2.04	5.19	1.80	5.09	0.01
3—Highways and highway bridges	....	....	1.54	3.78	1.39	48.35	0.01	....	0.57	9.11	0.09	0.09	2.20
4—Automotive	0.01	....	4.29	0.33	42.86	0.03	43.06	0.08	38.24	0.77	58.63	0.90	5.99
5—Oil, gas and water	0.17	0.03	14.30	3.20	1.48	0.18	0.07	0.72	3.24	0.74	0.18	34.62	0.47
6—Mining, quarrying, lumbering	6.12	3.91	1.13	0.66	0.44	0.36	0.02	....	0.19	0.54	0.06	0.49	0.78
7—Agricultural	0.04	0.02	1.23	0.61	4.28	1.61	7.18	....	1.03	1.98	2.20	0.32	14.77
8—Shipbuilding and repair	0.01	0.01	5.94	1.75	0.49	....	0.07	....	0.06	0.11	0.02	0.19	0.10
9—Machinery, tools, equipment (including electrical)	0.11	0.07	5.39	3.09	7.14	0.66	7.27	0.06	6.10	0.69	3.66	2.57	1.60
10—Food and packing industry (all containers)	....	0.05	1.14	0.22	0.46	....	14.69	81.62	5.23	2.13	3.10	0.04	1.87
11—Exports	11.41	4.61	2.56	2.62	0.97	1.06	1.34	7.40	1.77	8.46	0.66	5.91	5.13
12—Miscellaneous	1.26	1.32	18.19	4.30	14.97	2.70	13.90	5.90	17.83	9.80	18.40	4.76	17.98
Jobbers	0.59	3.13	8.79	14.89	11.48	8.88	4.02	3.04	8.09	44.10	6.41	41.03	36.34
Grand totals	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00



the fact that the steel code, effective Aug. 19, specified a new classification for certain products which had the effect of including under strip steel certain sizes and shapes which heretofore have been grouped under bars, bands or plates, and of eliminating the classification of hoops and bands. The change in classification in the mid-year made it impossible for the reporting companies to group their products uniformly; therefore, some discrepancies in the distribution of the individual products involved undoubtedly exist. This confusion is temporary, inasmuch as distribution for 1934 will be figured on the basis of the new classification.

Small Tonnage for Breweries

Legalization of beer, widely hailed as a boon to the steel industry, really played a minor role in steel consumption in 1933. In an attempt to ascertain the tonnage required by the brewing industry, STEEL issued questionnaires to all producers of rolled finished steel. Many had not kept a record of shipments of steel to the beer industry and therefore were unable to supply the desired information. However, the returns from those who were able to reply showed that the steel going to the brewing industry represented only 1.8 per cent of the total finished steel output of the reporting companies.

This percentage, if applied to the total production of steel applicable for the manufacture and dispensing of beer—plate, shapes, bars, sheets, strip steel, tubes and wire products—would give a total of 189,500 tons of steel consumed in the beer industry. This empirical figure undoubtedly is high, but it serves to show that legal beer has been only a slight factor in the improvement of steel consumption during 1933.

Of the tonnage reported for beer use, 70 per cent was for beer barrels and beer bottle cases, 29 per cent for brewery buildings and equipment, and 1 per cent for bars, tables and other dispensing equipment and furniture.

The actual returns, as reported by companies producing 5,072,381 tons of rolled steel products applicable to use for beer, follow:

	Brewery bldgs., equip., etc.	Bars, tables, etc.	Beer barrels, cases	Total
Plates	19,023	.....	100	19,123
Shapes	5,611	.....	.....	5,611
Bars	794	192	985	1,971
Concrete bars	334	.....	.....	334
Hoops, bands	350	.....	8,945	9,295
Sheets	413	936	22,723	24,072
Strip	62	10	29,104	29,176
Tubes, pipe	339	.....	.....	339
Wire products	30	.....	2,065	2,095
Totals	26,956	1,138	63,922	92,016

Distribution of Steel in Gross Tons to Consuming Groups

Based on 1933 Returns from 86 Operating Companies

	Rails, heavy and light	Angle bars, steel ties and other track accessories	Plates	Structural shapes over 3 inch	Bars, except concrete bars, and shapes under 3 inch	Concrete bars	Hoops, bands or narrow hot rolled flats	Black plate for tinning
1—Railroads								
a Cars and locomotives	5	2,101	147,169	34,498	112,864	8	761	4
b Track construction and repair	327,052	187,120	3,171	1,015	27,210	.....	250	.....
c Buildings and bridges	289	2,297	28,324	45,199	14,561	3,736	.....	.....
2—Buildings								
a Erection materials, framework, trim, etc.	367	16	172,270	387,091	93,663	108,391	7,763	1,220
b Furnishings, furniture, stoves, refrigerators, etc.	.....	.....	1,902	4,041	44,946	4	10,342	8,201
c Other miscellaneous products for buildings	.....	.....	5,121	5,000	3,284	173	.....	11,113
3—Highways and highway bridges	.....	.....	15,512	27,966	29,279	150,158	13	18
4—Automotive	25	9	43,220	2,427	906,030	97	98,347	1,449
5—Oil, gas and water	701	72	144,247	23,678	31,178	554	169	12,617
6—Mining, quarrying, lumbering	24,978	8,630	11,415	4,864	9,395	1,129	53	.....
7—Agricultural	179	52	12,405	4,530	90,438	5,000	16,396	.....
8—Shipbuilding and repair	26	20	59,928	12,962	10,266	.....	170	.....
9—Machinery, tools, equipment (including electrical)	433	149	54,355	22,825	150,994	2,052	16,598	961
10—Food and packing industry (all containers)	.....	98	11,484	1,594	9,836	.....	33,553	1,424,624
11—Exports	46,596	10,174	25,804	19,378	20,442	3,281	3,050	129,194
12—Miscellaneous	5,153	2,902	183,439	31,807	316,459	8,373	31,760	102,940
Totals	405,804	213,640	919,766	628,875	1,870,845	282,956	219,225	1,692,341
Jobbers	2,402	6,892	88,652	110,012	242,581	27,567	9,182	52,996
Grand totals	408,206	220,532	1,008,418	738,887	2,113,426	310,523	228,407	1,745,337

	All other black plate and sheets except galv. sheets	Galvanized sheets	Strip steel	Tubing and pipe	Wire products	All other finished steel products	Grand totals	Per cent of Total
1—Railroads								
a Cars and locomotives	28,075	8,917	15,223	16,696	19,979	54,152	440,452	3.20
b Track construction and repair	19	23	239	1,229	7,975	7,120	562,423	4.09
c Buildings and bridges	386	1,040	458	465	4,692	1,095	102,542	0.75
2—Buildings								
a Erection materials, framework, trim, etc.	39,370	36,260	18,106	22,341	83,214	9,891	979,963	7.14
b Furnishings, furniture, stoves, refrigerators, etc.	275,263	59,992	38,108	868	60,919	3,792	508,378	3.70
c Other miscellaneous products for buildings	44,950	33,624	26,987	53,080	185	476	183,993	1.34
3—Highways and highway bridges	12,535	59,084	1,283	886	30,476	210	327,420	2.38
4—Automotive	840,819	5,007	882,215	9,410	82,976	7,629	2,879,660	20.95
5—Oil, gas and water	71,291	4,774	2,702	360,747	6,578	11,924	671,232	4.88
6—Mining, quarrying, lumbering	4,077	3,516	955	5,086	10,831	3,304	88,233	0.64
7—Agricultural	22,773	12,818	33,027	3,320	204,736	7,449	413,123	3.01
8—Shipbuilding and repair	1,352	733	326	1,973	1,401	187	89,344	0.65
9—Machinery, tools, equipment (including electrical)	134,191	4,480	55,057	26,747	22,144	7,700	498,686	3.63
10—Food and packing industry (all containers)	114,995	13,821	46,606	434	25,925	28	1,682,998	12.25
11—Exports	38,833	54,825	9,998	61,548	71,058	2,710	496,891	3.61
12—Miscellaneous	392,109	63,517	276,859	49,634	249,182	54,246	1,768,380	12.87
Totals	2,021,038	362,431	1,408,149	614,464	882,271	171,913	11,693,718	85.09
Jobbers	177,867	285,916	96,459	427,476	503,562	17,839	2,049,403	14.91
Grand totals	2,198,905	648,347	1,504,608	1,041,940	1,385,833	189,752	13,743,121	100.00

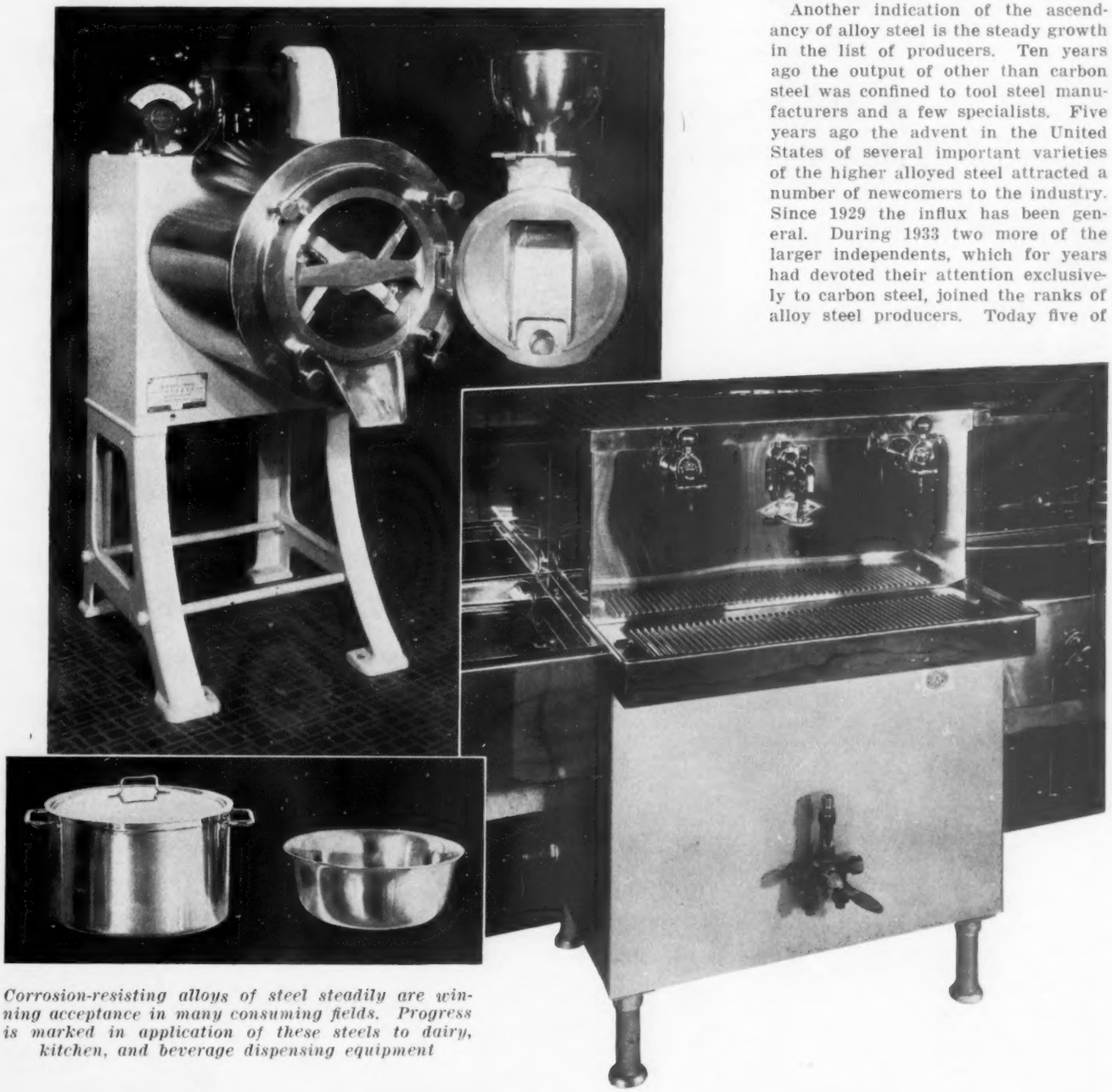
Alloy Steel Is Destined To Become Tonnage Product of Wide Use

THROUGHOUT the depression, production of alloy steel has fared better than that of ordinary steel. The appeal of new alloys and their ability to penetrate markets which are closed to carbon steel have given them a measure of protection from the extreme rigors of the depression period.

While this fact was emphasized in the figures for 1930, 1931 and 1932, it remained for 1933 to demonstrate the remarkable recuperative qualities of the demand for alloy steels. Last year the output of all steel ingots totaled 22,776,000 tons, as compared with 13,322,833 tons in 1932—a gain of 70.9 per cent. In the same period, according to reports by producers to STEEL, the output of alloy steel ingots increased 121.8 per cent! In other words, the advance in the output of alloy steel ingots was 70 per cent greater than that in the production of all steel ingots.

This gratifying record should not surprise those who have been watching the alloy steel industry carefully. Perhaps the most intelligent merchandising to be found in the entire iron and steel industry is that employed by the leading producers of alloy steels. Similarly, the most intensive market development is that undertaken by the alloy steel interests.

Another indication of the ascendancy of alloy steel is the steady growth in the list of producers. Ten years ago the output of other than carbon steel was confined to tool steel manufacturers and a few specialists. Five years ago the advent in the United States of several important varieties of the higher alloyed steel attracted a number of newcomers to the industry. Since 1929 the influx has been general. During 1933 two more of the larger independents, which for years had devoted their attention exclusively to carbon steel, joined the ranks of alloy steel producers. Today five of



Corrosion-resisting alloys of steel steadily are winning acceptance in many consuming fields. Progress is marked in application of these steels to dairy, kitchen, and beverage dispensing equipment

the first seven ranking steelmaking companies are actively engaged in the production and marketing of alloy steel.

The magnet which has drawn such powerful interests into the alloy steel business is the group of rust- and heat-resisting steels, of which "18-8" is the most widely known. Within a few years these materials have gained a strong foothold in a number of important markets. Their application on bright parts of automobile; in the dairy, petroleum, paper and chemical industries; for refrigerators, stoves and other kitchen equipment for homes, restaurants, hotels, hospitals, etc; for cooking utensils and electric household appliances; and in numerous other fields has opened the eyes of steel company executives to the potentialities of this type of steel.

Those who have investigated the markets for corrosion-resisting steels are impressed with two important facts: First, that the most enthusiastic users and fabricators of these steels are those who have had the most experience with them. Second, that while the relatively high price of stainless steel tends to retard its application in some markets, the most important factor for immediate consideration is education of users and fabricators to the proper use of the material.

At this stage there is danger that the appeal of the new product and the glamor of its unusual properties may outrun the skill and experience required to apply it intelligently. Grief of this character has visited almost every new material, process or equipment in the early stages of its development.

Careful Selection Essential

The experience of a few years has proved that stainless steels cannot be applied indiscriminately. With the advent of more varieties of this grade of steel the need for careful selection is heightened. Moreover, the problems encountered in fabrication are peculiar to the metal. Much of the difficulty reported by some fabricators is due entirely to their attempts to handle 18-8 and straight chromes as if they were identical materials.

In spite of the fact that the leading producers have done remarkable work in sales engineering, much remains to be done in helping fabricators to apply stainless effectively. More attention to welding problems would be profitable. The wider dissemination of reliable instructions for die practice in connection with various grades of stainless would go far in breaking down the belief, prevailing in many quarters, that the material is difficult to handle in deep drawing. The same degree of confusion exists among many manufacturers in connection with spinning, polishing and other forming and finishing operations.

A great advantage in ironing out fabricating difficulties is that the majority of users of the higher alloyed steel entertain fantastic ideas as to the cost of forming and finishing the metal. Frequently cases are found where the fabrication costs in a plant experienced in handling stainless are only half those of the shop where the personnel is not familiar with the best practice. Education is the surest way of breaking down the prejudice against the material which arises from unfortunate fabricating experiences. Time and patience are required to overcome adverse opinion acquired in this way.

From progress in the past year it is apparent that stainless steel, despite higher costs, is gaining ground rapidly. It is being specified for kitchen equipment where large groups are served. For instance the rebuilt "quad" plan at Harvard and Yale, requiring kitchen dormitories, takes much stainless steel. Probably the largest use of stainless steel for miscellaneous interior use is in the Yale gymnasium where the rowing tank, showers, piping, doors, lavatories, etc., involve the use of much stainless.

Stainless for Architectural Use

Lack of important building construction naturally has retarded its use in outside decorative work, as in the case of the Empire State building, Chrysler tower and other structures in New York.

Hangers for tunnel work carrying ventilating systems where atmospheric conditions are severe and tend to bring about quick corrosion are commanding the use of stainless steel. In the Boston-East Boston tunnel a large tonnage of stainless steel bars are used.

An interesting problem of market development is afforded in the attempt to introduce steel beer barrels. Prior to prohibition, wood was used almost exclusively. When the bar was lifted in March, an acute shortage of seasoned white oak gave a temporary advantage to steel. Steel barrels now are fighting to retain their foothold in the new market. Their adversaries are the strongly entrenched co-operage companies, their unionized employes, and that portion of the brewery industry which clings to the tradition of wood.

The field for alloy steel was broadened during 1933 by the introduction of new alloys and experiments

Where Alloy Steel Went, 1928-1933

Percentage of Consumption by Groups

	1928	1929	1930	1931	1932	1933
Automotive	79.67	61.40	62.23	72.67	77.64	68.28
Machine tool	2.65	6.34	8.95	6.17	3.54	3.57
Oil industry	0.87	4.07	4.73	1.16	0.82	1.96
Agricultural	0.49	4.05	5.94	3.30	1.69	2.07
Construction	0.60	3.72	1.00	1.09	0.68	0.66
Export trade	1.18	1.38	1.16	0.88	0.43	0.29
Railroads	1.17	1.02	2.66	1.83	1.92	0.92
Shipbuilding	0.28	0.22	0.79	0.52	0.42	0.47
Miscellaneous	13.09	17.80	12.54	12.38	12.86	21.78

How Alloy Steel Was Used, 1928-1933

Percentage of Consumption by Products

	1928	1929	1930	1931	1932	1933
Hot rolled bars	81.70	61.87	70.50	54.48	77.28	69.81
Cold drawn bars	5.23	11.43	5.32	25.65	11.68	19.05
Sheets	0.72	11.03	0.94	0.69	1.14	1.29
Plates	0.56	1.04	3.05	1.95	0.65	0.59
Pipe and tubes	5.93	6.33	8.84	8.60	4.80	3.57
Wire	1.19	0.05	0.08	0.06	0.28	0.33
Structural shapes	0.18	0.12	0.42	0.07	0.11	0.01
Merchant shapes	0.18	.....	.....	.....	.....	.....
Hot rolled strip	0.95	4.43	3.86	1.31	0.66	2.88
Cold rolled strip	0.03	0.09	0.06	0.04	0.43	0.51
Tool steel	1.64	1.36	0.80	2.03	1.07	0.48
Forgings	1.76	2.25	6.13	5.12	1.89	1.48

with new alloying elements. Titanium was added to chrome-nickel stainless steel of the 18-8 type in a fixed ratio to the carbon content for the desired purpose of stabilizing the steel against the action of the heat during the welding process. Nickel was more widely employed in the fabrication of caustic evaporators. Development of alloys of iron with nickel, chromium and molybdenum to resist the action of such acids as hydrochloric, phosphoric and acetic also was credited to the year just closed. An alloy containing nickel, chromium and iron made its initial appearance.

Of recent development is the method employed for casting high-chromium steels centrifugally. This process, according to an authority on alloy steels, makes possible the casting of large tubes from alloy compositions which at present can-

dication of being satisfactory in its defined field, the manufacturer plans to follow a reasonably conservative policy in releasing the material, by selecting representative applications in various industries and closely following those applications during the initial period of commercial development.

Changes in Distribution

Returns from companies producing about 80 per cent of the alloy steel output of the country show that in 1933 the principal changes in distribution occurred in the automotive field and in miscellaneous consuming groups.

As usual the automotive industry held its dominant position as consumer of the bulk of the output. In 1933 its proportion was slightly more than two-thirds of the total. The machine tool industry held con-

bars was 19.05 per cent in the current year, against 11.68 in 1932.

The breakdown of consumption by individual products is interesting in that it reflects greater diversification in the distribution of eight of the ten products. In the case of hot rolled and cold drawn bars, plates, pipe and tubes, wire, shapes, cold rolled strip, tool steel and forgings, the distribution to "miscellaneous" or unclassified consuming fields increased, in point of percentage of the total, over the corresponding figures for the preceding year. This, of course, is detailed confirmation of the gain in total distribution of all alloy products to miscellaneous consumers, referred to in a previous paragraph.

The growing importance of the alloy steel industry justifies the compilation of much more complete statistics on production and consump-

Distribution by Percentage of Alloy Steel in 1933

Shown by Consuming Groups and Individual Products

Group	Hot rolled bars	Cold drawn bars	sheets	Plates	Pipe and tubes	Wire	Structural shapes	Merchant shapes	Hot rolled strip	Cold rolled strip	Tool steel	Forgings
1. Automotive	69.56	69.82	2.48	57.10	73.17	0.31	9.09	.....	89.20	65.83	4.04	34.21
2. Machine tool	3.01	5.43	0.91	5.29	0.05	2.59	12.12	.....	5.53	0.20	21.79	8.19
3. Railroad	1.17	2.24	0.47	0.17	.....	.....	.....	.....	2.34	0.59	1.11	42.92
4. Agricultural	2.03	1.88	0.03	.....	6.52	12.14	.....	.....	0.82	.....	0.07	.....
5. Construction	0.32	0.10	23.79	4.02	0.20	.....	63.64	.....	.....	5.27	.....	3.08
6. Shipbuilding	0.06	0.69	2.00	2.65	0.10	.....	.....	.....	.....	0.33	0.07	4.58
7. Oil industry	0.79	1.01	0.52	4.95	2.98	.....	3.03	.....	0.03	.....	0.14	2.28
8. Exports	0.43	0.38	0.55	.....	2.15	2.39	.....	.....	.....	0.07	0.41	.....
9. All other	22.63	18.45	69.25	25.82	14.83	82.57	12.12	.....	2.08	27.71	72.37	4.74

not be fabricated into seamless tubing. Larger diameter tubes have been made by this method than those of high-chromium steels capable of being pierced on the conventional type piercing mill. Several tubes of 13 inches diameter, 12 feet long and with a wall thickness of ⅝-inch recently were cast from a steel of 25 per cent chromium, 12 per cent nickel and 0.30 per cent carbon and installed in a chemical process operating at 1832 degrees Fahr.

Stainless clad steel sheets were employed last year for the interior of milk truck tanks on account of the material affording freedom from rust. Alloy iron woodworking chisels were cast to shape, hardened, tempered and polished to the form suitable for service and marketed in 1933. While the Rockwell hardness is somewhat lower than that of forged steel, the cutting edge has been found to be durable and effective.

An important development of the year was the announcement by Dr. Zay Jeffries of the practically carbon-free iron-tungsten-cobalt metal cutting material known as alloy 548. While the new alloy gives every in-

sistently to its position in second place, with a percentage of 3.57. Consumption of alloy steel for the oil industry, agricultural industry, construction, exports, railroads and shipbuilding was not noticeably different from that of previous years.

According to the figures much of the reduction in automotive percentage from 77.64 in 1932 to 68.28 in 1933 was taken up in the miscellaneous consuming groups. The proportion taken by these unclassified industries in 1933 was 21.78 per cent, a distinct gain from the 12 and a fraction per cent which has prevailed during the last three years.

Consumption Shows Shifts

Important shifts in the percentage of consumption by products are confined to hot rolled and cold drawn bars. In 1932 these two products accounted for 88.96 per cent of the total tonnage; in 1933 they represented 88.86 per cent. However, as in previous years, there was a decided shift in individual percentages. In 1933 the percentage of hot bars to the total was about 70 per cent as compared with 77 in the previous year. The proportion of cold drawn

tion than are now available. Many of the companies co-operate fully in providing confidential returns of the distribution of their alloy products. Some others have not as yet participated in the collection of statistics and their failure to co-operate prevents the industry from having a complete picture of where its product goes.

Aside from refining the present statistics on production and distribution, the greatest need is for a breakdown of output which will show the totals or percentages of the various classes of alloy steels. The higher alloyed steels in the "stainless" group constitute a specialty product of such potential importance that it deserves complete statistics of its own. This also is true of several of the other classifications.

STEEL is mak'ng an effort to present a clearer picture of the status of the alloy steel industry. The cooperation of most of the leading producers has encouraged this publication to believe that progress is being made and will continue, and that in a short time the statistics required by industry will be available.

Merchandising Is Need in 1934

(*Concluded from Page* 95)

that the future development of steel consumption in the field of home construction will be found in houses of "individual, nonstandardized design as distinguished from the mass production house." The Corporation clearly looks to "architects, builders and local fabricating shops as the natural and most promising avenue of exploitation."

On the basis of present developments, 1934 may be expected to bring a clearer definition of the trend in the application of steel to house construction. A sufficient number of models of various types now are available to afford experience to home owners, contractors and suppliers of materials. Admittedly, the ultimate form of construction has not been evolved. Progress is slow, due partly to the influence of the depression, but caused also by the multiplicity of ideas, the lack of definite plan in "selling" the steel house to the public, and the confusion among contractors, builders and others as to the advantages of competing types of construction.

Improvement in residence construction in 1934 undoubtedly would aid materially the introduction of steel into this field. Under the circumstances prevailing in the past few years the public has responded encouragingly to the steel frame idea. Its reaction to the sheet steel construction is not conclusive; fewer models have been erected and the lapse of time required for trial has not been great enough to afford a fair measure of appraisal.

Therefore, steel requirements in 1934 probably will continue to be restricted. The day of a more general use of steel in home construction is coming, but it must await a period of necessary development and refinement.

Reform Is Next on 'New Deal' Agenda

(*Concluded from Page* 92)

administration nor business has proposed any noteworthy amendments. In fact, the only threat to NRA is an effort to terminate the exemption of business from the operation of the antitrust law, and this is not taken seriously.

But this surface tranquillity is deceptive. In the enforcement of codes and the powers permitted to code authorities there is wide latitude for introducing even more radical revision of business practice than has thus far been attempted. For example, in codes now in process, all acts of the code authorities are being made subject to review, and approval or disapproval, by the NRA administration.

Great as the possibilities appear for rationalizing competition and trade practices, only inhibitions on misbranding, misrepresentation and false advertising are now being permitted by the consumers' advisory board of NRA.

Organized labor is no less adamant that it be recognized in the selection of government representatives on code authorities.

Industry Hesitant at First

When NRA first was proposed last year the shock was severe and the resistance of industry widespread, especially on account of the favored position accorded to labor. The manner in which industry was summoned to Washington and regimented created grave doubts concerning the ultimate success of the project.

Then followed a period when business began to recover—although iron and steel at first ran counter to the trend—and the doctrine of NRA became more acceptable. In the case of iron and steel, firm extras were applied, uniform wage rates were decreed, prices began to approach more remunerative levels, and unethical competition was restrained. Toward the end of the year a swing to the left was evident in NRA, and labor again was in the saddle.

Notwithstanding the apparent benefits, the fact is that a bridle has been placed on business and the potentialities of an administration of NRA more radical even than that of General Johnson are enormous.

As Dr. Virgil Jordan, president of the National Industrial Conference board, said recently the prospect for resumption of business improvement during the next six months is favorable, but the long term possibilities of the new deal program are so serious as to make this possible rise in business relatively unimportant.

"A new cycle of recovery of business unquestionably is under way, but when it is achieved we may well wonder whose business will it be," said Doctor Jordan.

In its simplest elements, NRA is collectivism—a fact which organized labor was first to see and capitalize. With a different background, collectivism also has been the actuating motive in Russia, Italy and now Germany.

In Russia and Italy an economy of want had to be dealt with; in the United States it was an economy of surplus of production and facilities, both industry and agricultural. But in its essence it is collectivism.

One effect of NRA which may become more manifest this year is the decentralization of industry. Heretofore, manufacturing in small towns has been predicated upon lower wage scales, in turn made possible by lower cost of living.

But under NRA uniform wage scales virtually blanket all of the North and all of the South, and the manufacturer remote from large markets, which in most cases are the large cities, is handicapped.

As 1934 wears on, it is a safe forecast that fear of inflation and discussion of manipulation of foreign exchange will pale before a realization of the social aspects of NRA. Government control of business was achieved in 1933. How it is exercised will make or break 1934.

FEW presidents have been the equal of Franklin D. Roosevelt in gaging the sentiment of the nation, a fact of which the congress convening Jan. 3 is both aware and respectful.

Coupled with the fact that Republican counsels are divided and former President Hoover is urging that the economic errors of the administration be permitted to accumulate, this appears to insure a co-operative congress.

The passage of time inevitably tempers some of the docility displayed at the special session of congress last spring. But in November the entire house of representatives and one-third of the senate will be elected, and it will be better to be with than against the President, it appears at this juncture.

Limited remonetization of silver authorized Dec. 12, the gold purchase policy, and anticipation of formal devaluation of the dollar are quieting influences on radical inflationists.

The chief proponent of a soldier's bonus bill announces he will not push his measure this session.

Tariff Threats Vanish

The Grundy tariff, assailed so bitterly during the presidential campaign, stands unaltered. Secretary Wallace is convincing farmers that in order to sell their products abroad the country must buy foreign manufactures, but against this is the recognition of the administration that industries require protection because of higher costs of production under NRA. No serious tariff change thus seems probable.

Tax revision will take the form of new liquor levies, second of eliminating the looseness in the present income taxes, and third of a new basis for taxation, as yet undisclosed.

Comparatively speaking, congress will be mild, NRA will be little modified, the chief concern of business in 1934 will apparently be the administration of "the new deal," and have as its objective keeping the revolutionary process in Washington in orderly channels.

STEELMAKERS ADOPT 4-HIGH MILLS TO WIN BROADER MARKETS

By J. D. Knox
Associate Editor, STEEL

CONSTRUCTION, rehabilitation and repair in the iron and steel industry in 1933 showed clearly that management is directing its principal attention to the finishing departments of the business. While it is true that noteworthy improvements were made in iron and steel producing units, a survey of equipment expansion and replacement throughout all branches of the industry indicates unmistakably the ascendency of finishing mill equipment in the minds of steel company executives.

Moreover, the great emphasis on this phase of mill operations is centered chiefly on equipment for rolling and finishing flat rolled products—sheets, strip and black plate in coiled form.

Especially noteworthy is the trend toward equipment for cold rolling strip steel for the purpose of producing material for "superdraw" tin plate. On one 4-high mill recently completed for the production of this commodity, the thickness tolerance will be held to 0.0005-inch. Most of the single stand 4-high cold mills installed by various tin plate producers to roll black plate in coils are of basic design, some having nondriven rolls and driven reels and others having both the work rolls and reels driven. The mills make possible a new high rate of production, because of the rapidity with which the heavy strip may be rolled down to finished gage.

Reduces Number of Steps

The new mills not only increase the output as compared with conventional type tin mills but materially reduce the number of operations involved in the manufacture of black plate. As an example, the tin plate maker equipped with conventional 2-high mills and desiring to engage in the marketing of deep drawing tin plate must have a normalizing furnace. Starting with tin bars the operations include heating the pairs, roughing them down, match breakdowns and roll, rematch or double, reheat pack, roll pack, redouble, reheat pack, finish roll to length, normalize, black pickle, three passes in 2-high cold mill, white anneal, white pickle and tin coat.

Employing the new 4-high mills for rolling the black plate in strip form, the following steps are involved. Hot roll the slabs to about 16 gage, subject the strip to a continuous pickle, cold roll to gage on a 4-high mill equipped with tension reels on each side of the mill, white anneal in short lengths, white pickle and tin coat. Thus, a total of six operations compares with 15 steps required when deep drawn black plate is made by conventional methods.

Employ 3-High Mills

Table V indicates that 3-high mills for rolling sheets again are coming into favor. In a mill of this type the top and middle rolls are counterbalanced, the top roll being driven through pinions. In using 3-high mills for roughing sheet bars, five passes are involved in the breakdown. The bars worked in pairs are given a pass between the bottom and middle roll, returned to the roller's side of the mill between the top and middle rolls, matched and given three additional passes.

The advantage of using a 3-high mill when roughing packs of twos is that the length and gage can be held uniform as well as the contour of the ends throughout the various turns. In view of the fact that the middle roll must be changed frequently, rolling mill engineers are endeavoring to effect a design whereby the middle roll can be changed without shutting down the mill.

For the past two years the tendency in cold strip installations has been to decrease the number of stands in tandem, usually two or three, but this year a mill will be completed having five stands in tandem and served by a tension reel. The first and last stands will be driven by a 500-horsepower motor each, and the three stands between with a 750-horsepower motor each.

Production of sheets and cold rolled strip steel using 4-high mills appears to be on the ascendency, based on the number installed in 1933 and under construction as the year ended. With the working rolls driven and a tension reel on each side and with steel in the rolls, it is essential that the strip between the rolls and the reel be under constant tension. While the mill is getting under way, therefore, the setting of the current regulator automatically is altered to conform to the acceleration or deceleration of the rolls. On a mill of this type recently placed in operation, the reduction in the thickness of the cold strip ranges from 0.25 to 0.01-inch. The rolls are adjusted by a automatic preset screwdown control. While the work is in the pass, the operator sets an indicator on the dial corresponding to the gage he next desires. Upon completion of the first pass the control switch is actuated and the screwdown motors automatically effect the desired roll setting.

Seamless Mill Installed

During 1933 the second Diescher type seamless tube mill was installed at a plant in Pennsylvania and as the new year opened the third was under construction at the plant of a tubemaker in the Pittsburgh district. This type mill reduces the diameter and the wall thickness of seamless tubes simultaneously by cross rolling. Only three operations are involved, namely, heating, piercing and elongating. After a mandrel bar is pushed through the pierced hollow, the work is advanced into the bite of the elongator. This is built with a set of barrel-shaped rolls arranged with their axes inclined to each other and to the path of travel taken by the tube. The cross rolls cause the blank to bulge laterally from the mandrel, assume an elliptical form and make contact

Table I

Recapitulation

	Completed 1933	Building 1933
Open-hearth furnaces	4	0
Stacks remodeled	4	2
Rolling mills:		
Bar	2	1
Blooming	1	0
Pipe, buttweld	1	0
Seamless	0	1
Sheet, 2-high hot	0	1
Sheet, 3-high hot	3	0
Strip, 2-high cold	0	2
Strip, 4-high hot	1	0
Strip, 4-high cold	10	5
Tin, hot	2	0
Total	20	10

with a set of 2-high grooved rotating driven guide disks arranged between the cross rolls. Once in engagement with these rolls, no further bulging is possible. The surface of the cross rolls are machined with an outward flare from the neck of the pass in such a way that the elliptical contour of the tube is converted into a cylindrical cross section of any desired wall thickness and diameter.

Although this accomplishment alone constitutes an important advancement in the process of manufacturing seamless tubes, it greatly is enhanced by the rapidity and the ease with which the tubes are made and the comparatively simple processing involved in their production.

One of the important contributions of 1933 was the initial production on a commercial scale of nondendritic steel—a steel made in the electric furnace, poured into an annular bloom, kept under centrifugal pressure until solid and marketed in the form of cold drawn bars of standard analysis. The process is controlled by the Rotary Electric Steel Co. (Michigan). All-scrap heats are melted and refined in an electric furnace which has a capacity of 15 tons an hour. The melt is converted into blooms 7 x 7 inches in cross section by seven rotary casting machines each equipped with a mold 10 feet diameter. After the steel is solidified, it is stripped from the mold and cut into arcuated-shaped blooms. These are converted into billets on a breakdown mill and subsequently into cold drawn bars of standard analysis. A description of the process in detail was presented

Equipment Completed and Building in 1933

Table II

Open Hearths Completed in 1933

Company	Number of furnaces	Rated capacity, tons	Annual capacity, tons
American Steel Foundries, Granite City, Ill.	*1	30	25,000
Granite City Steel Co., Granite City, Ill.	*1	60	50,000
Great Lakes Steel Corp., Detroit	2	150	171,400
Total	4		246,400

*Stevens type.

Table III

Stacks Remodeled in 1933

Company	Number or Name
Alan Wood Steel Co., Swedeland, Pa.	Nos. 2 and 3
Republic Steel Corp., Buffalo	No. 1
Republic Steel Corp., Youngstown, O.	No. 2
Total	4

Table IV

Stacks Being Remodeled Dec. 31, 1933

Company	No. or Name
Bethlehem Steel Co., Sparrows Point, Md.	*"D"
Colorado Fuel & Iron Co., Pueblo, Colo.	"E"
Total	2

*Replacement: 1000 tons or more daily capacity.

Table V

Rolling Mills Completed in 1933

Company	No. stands	Type mills
American Sheet & Tin Plate Co., Gary, Ind.	1	84" 4-high cold strip
American Sheet & Tin Plate Co., Gary, Ind.	1	3-high hot sheet
American Sheet & Tin Plate Co., Vandergrift, Pa.	1	3-high hot sheet
Andrews Steel Co., Newport, Ky.	1	34" blooming
Andrews Steel Co., Newport, Ky.	1	26" bar
Andrews Steel Co., Newport, Ky.	1	24" bar
Andrews Steel Co., Newport, Ky.	1	30" 4-high hot strip
Bethlehem Steel Co., Sparrows Point, Md.	1	3-high hot sheet
Canton Tin Plate Corp., Canton, O.	1	28" hot tin
Carpenter Steel Co., Reading, Pa.	1	12" 4-high cold strip
Follansbee Brothers Co., Follansbee, W. Va.	*1	38" 4-high cold strip
Follansbee Brothers Co., Follansbee, W. Va.	1	40" hot tin
Inland Steel Co., Indiana Harbor, Ind.	*1	38" 4-high cold strip
Inland Steel Co., Indiana Harbor, Ind.	1	42" 4-high cold strip
Laclede Steel Co., Alton, Ill.	**1	14" roughing
Mercer Tube & Mfg. Co., Sharon, Pa.	1	buttweld
National Tube Co., Ellwood City, Pa.	**1	seamless
Republic Steel Corp., Warren, O.	*1	38" 4-high cold strip
Republic Steel Corp., Canton,, O.	**1	12" bar
Thomas Steel Co., Warren, O.	*1	20" 4-high cold strip
Universal Steel Co., Bridgeville, Pa.	*1	20" 4-high cold strip
Weirton Steel Co., Weirton, W. Va.	*1	28" 4-high cold strip
Youngstown Sheet & Tube Co., Indiana Harbor, Ind.	1	42" 4-high cold strip
Total	20	

*Rolls frictionally driven
**Replacement

Table VI

Rolling Mills Building Dec. 31, 1933

Company	Number Stands	Type Mill
American Sheet & Tin Plate Co., Gary, Ind.	2	84" 4-high cold strip
Bethlehem Steel Co., Sparrows Point, Md.	1	8" bar
Eastern Rolling Mill Co., Baltimore	1	84" 4-high cold strip
Jones & Laughlin Steel Corp., Aliquippa, Pa.	1	42" 4-high cold strip
Pittsburgh Steel Products Co., Allenport, Pa.	*1	seamless tube
Reeves Mfg. Co., Dover, O.	1	28" hot sheet
United States Steel & Wire Co., Newark, N. J.	1	8" cold strip
United States Steel & Wire Co., Newark, N. J.	1	12" cold strip
Wheeling Steel Corp., Yorkville, O.	1	42" 4-high cold strip
Total	10	

*Diescher type.

for the first time in the March 13 issue of STEEL.

For the fifth consecutive year no blast furnaces were built in this country. On the other hand interest was centered on increasing the efficiency of stacks already in service. According to the opinion of one authority, fanning gave way to moderate but continuous blowing and even the larger stacks were operated on mild wind rate. Skill on the part of many merchant operators was demonstrated in effecting rapid change-overs from one burden to another. Reduction in the loss of flue dust and an improvement in the distribution of raw materials in the stack were due largely to the inverted batter at the top of the stack.

Notch Stopped Against Blast

New types of electrically-operated mud guns, which stop the iron notch against the pressure of the blast, were developed and proven reliable. With the trend toward continuity in blowing, interest in this auxiliary unit again is being displayed. Successful use of blast furnace gas in coke oven, steelmaking and rolling departments demonstrates the need for fine cleaning. Disintegration of blast furnace lining has been studied in its many ramifications, and a campaign of a million tons of pig iron on a single refractory lining soon can be expected.

No by-product coke ovens were built last year in this country, nor were there any under construction as the new year opened. Two benzol refining plants, however, were completed, one for the Calco Chemical Co. Inc., Bound Brook, N. J. and the other for the Seaboard By-Product Coke Co., Kearney, N. J.

Active interest in auxiliary equipment for iron and steelworks and in rebuilding programs was demonstrated by many companies throughout the country. At the plant of the Colorado Fuel & Iron Co., Pueblo, Colo., relining of the "D" stack, which was started in 1931 and temporarily held up, was completed. Furnace "E" is being rebuilt and is expected to be ready for filling early this year. Its hearth diameter has been increased from 19 feet 1 inch to 20½ feet. Both stacks were given new shells and were equipped with automatic control, including electric bell hoist and continuous rodding. Furnace "E" will be served by an electrically-operated mud gun. In the steelmaking department ten open-hearth furnaces have been rebuilt including new bottoms. One of the 60-ton open hearths at the plant of the Atlantic Steel Co., Atlanta, Ga., was rebuilt to burn natural instead of producer gas and some changes made in the checker chambers.

Facilities for manufacturing tin plate were installed at the Indiana Harbor division of the Inland Steel Co., marking the initial entrance of this company into the manufacture of this commodity. Thirteen tinning machines of the automatic type will serve the tin house. Additional tinning equipment also was installed at the Yorkville, O. plant of the Wheeling Steel Corp.

In addition to rod coilers installed at the Madison, Ill. plant the Laclede Steel Co. also purchased coilers for its Alton, Ill. division. A wire mesh welding machine and additional wire drawing equipment were installed at the Alton plant and additions made to the warehouse and wire drawing departments. Two 5-block and two 6-block wire drawing machines were installed at the plant of the Continental Steel Corp., Kokomo, Ind. The latter company also inaugurated a program of improvement at its sheet mill division at Kokomo. One single and one double, coal-fired pair furnace and three double-chamber pusher-operated sheet furnaces were replaced with a double-chamber continuous conveyor-operated pair furnace and two conveyor-operated, single-chamber, double-row sheet furnaces. Three stands of conventional type hot sheet mills were converted into mechanical-operated units, now being served by automatic feeder and catcher tables.

Adds Annealing Furnaces

Bright annealing equipment was added by the Carpenter Steel Co., Reading, Pa., including a bell-type electric furnace, four stools and two heating elements for handling flat and round steel in coils. A 1500-pound air hammer of the Nazel type and a 16-spindle machine for polishing flat stock also were installed.

Improvements made by the Republic Steel Corp., other than mentioned in the accompanying tables includes additions to the 10-inch skelp mill for the production of coiled skelp and provisions for the manufacture of grade "C" casing and for upsetting oil country goods at the Youngstown division; equipment for producing and treating electrical strip and sheets at the Warren, O. division; and additional furnaces in the heat treating department at the Central Alloy division, Canton, O. The Republic company soon will engage in the manufacture of large size multiplate culverts, a plant having been completed for this purpose at Danville, Ill.

Provisions and extensions at Republic's die roll department in the Buffalo district were made to afford increased output of die-rolled products in longer and heavier unit sections. In the Chicago district alterations were made to provide for triple stranding in the 10-inch bar mill, an electric heat treating furnace for bars and forgings was installed and facilities added to manufacture railroad spikes, to produce tacks from coiled strip and to make patented spring wire. Production of an improved design steel fence post was started at the Moline plant.

Tests Made Magnetically

Extensive improvements were made at Republic's Massillon, O. division on account of its close proximity to the manufacture of carbon and alloy bars which assures prompt service to consumers. Grinding equipment was added to permit precision grinding of flat cold drawn steel products. Magnetic testing equipment was installed at both the Massillon, O. and Gary, Ind. plants for inspecting cold drawn bars for surface defects and internal seams and cracks. The detected imperfections are indicated by a curve produced by a beam of light shown on a ground glass. The work is free from imperfections as long as the curve remains of a certain amplitude and shape; any wave in the light curve, however, indicates defective stock. Bars up to 3 inches diameter can be inspected with the unit at the rate of 70 feet a minute. In addition, the apparatus can be employed for identifying grades of steel which have become mixed, or steel with a marked variation in analysis. Should the bars made from different heats of steel become mixed either in handling or in transit, the magnetic testing unit will assure the proper separation.

Two electric furnaces for the manufacture of electric steel were completed last year. The Ludlum Steel Co. installed one of its type furnaces with a daily output of 16 to 20 tons at its Watervliet, N. Y. plant and the Republic Steel Corp. added a 25-ton unit at its Canton, O. division.

Table VII

Blast Furnaces Dismantled in 1933

Company	Name of stack
Everett-Saxton Co., Everett, Pa.	Earlston
Marting Iron & Steel Co, Ironton, O	Ironton
Total	2

Ford Transfers Model Mine; New Iron Ore for Market

AN OUTSTANDING development of interest occurred on the Marquette range last year, in the transfer, in November, of the Blueberry iron ore mine from the Ford Motor Co., to the North Range Mining Co., of Negaunee, Mich.

The North Range company was organized by Frank P. Book, of Detroit, and R. S. Archibald, of Negaunee, to acquire and operate the mine. Prior to this the mine had been idle since October, 1932, although stockpile ore was shipped to Detroit during the past season.

Under the new management active operation was resumed Nov. 1, and is continuing. When previously operated by the Ford company, the use of the ore was confined to the company's own blast furnaces at Dearborn, Mich., but under the new operation some ore will be available for the market.

The Blueberry property comprises about 2200 acres in Marquette county and contains about 10,000 feet of the strike of the Marquette iron bearing formation.

The mine itself is developed on only 80 acres of the tract, and within this area the ore body has been developed to a length of 2000 feet. The remainder of the iron formation within the property is undeveloped.

The part of the iron formation on which the mine is located is the north rim of the Marquette basin, and this rim has several productive mines on it, including the Lloyd and the Morris, besides the Blueberry.

The Morris mine, and a mineral property owned by the Cleveland-Cliffs Iron Co., bound the Blueberry property on the east and the old American mine, formerly operated by M. A. Hanna & Co., is located immediately west of the Blueberry.

In 1924 and 1925 the Blueberry property was taken under option and explored by Mr. Archibald and Mr. Book. The results were gratifying and the property was eventually leased to the Ford company, which continued the exploration, and finally in 1926 began the development and equipment of it for underground operation.

Today it has capacity to produce 400,000 tons of ore per year, and is credited generally with being one of the most completely and modernly equipped iron mines in the lake region.

Developed to 1100 Feet

The mine has been developed by a standard, five-compartment shaft to a depth of 1100 feet. A shallow shaft, sunk to a depth of 100 feet, is connected with the main shaft on the first level. This is a drainage level, connected to the surface with a number of drill holes and, by means of a dam built on this level near the main shaft, water is impounded there for fire purposes and general consumption around the mine.

The main Blueberry shaft is of concrete construction to ledge and has steel shaft-sets with wood lath for the remainder of its depth. In this shaft, which is sunk in the footwall of the formation, cross-cuts to the south connect with the ore body on each of the four developed levels at 500, 600, 700 and 800-foot elevations respectively.

Electric haulage is employed on main levels, with trolley locomotives of 6-ton capacity used for ore, and a storage battery locomotive for tramming timber and other supplies. Ore is hauled in 76-cubic foot rotary dump cars. These are dumped into pockets built on the sixth, seventh and eighth levels, from which it is collected and transported to surface by 4-ton skips operating in balance in the shaft.

The design of the surface plant is impressive and distinctive. The headframe over the shaft is of steel construction and is equipped with a gyratory crusher, into which the ore is dumped from the skips, and from which it is either hauled in cars for stockpiling at an elevation of 40 feet above ground; or, if intended for direct shipment, it passes into chutes and pockets leading to the railroad cars.

The stockpiling arrangement consists of a steel trestle 800 feet long, with a storage capacity of approximately 100,000 tons. A larry car of 76-cubic foot capacity operates on this trestle by remote control from the shaft house.

The machinery and equipment above ground is housed in one building of U-shaped construction, the main part of which contains the hoists, compressors and other operating machinery. One L of the building contains the carpenter shop, blacksmith shop and

Buildings at the Blueberry mine resemble a modern factory more than mine structures. Henry Ford picked blueberries while walking over the site years ago, and thus gained the inspiration for its name

Some of the palatial public buildings erected in Minnesota mining towns, with iron ore tax money; and a typical street view in a Lake Superior mining community

At left, Hibbing's $4,500,000 high school; above, $2,000,000 recreation auditorium

Mining companies, under heavy taxes levied to support public extravagances, have had little left in recent years for real community development

warehouse, while the other L contains the office, laboratory and changehouse.

This entire building, which covers a large ground area, is of brick construction and resembles the modern factory structure, with a large amount of window space.

Equipment in the main part of the building consists of cage and skip hoists. The skip hoist is direct motion and the cage hoist is geared. Both hoists are equipped with Lilly control. There are two compressors, of 1000 and 2000 cubic feet, respectively.

A motor generator set supplies direct current to the top tram and to the underground motors and slusher hoists. Within the main part of the building also are installed two boilers for heating purposes.

The grade of ore produced from the mine is a standard, old range, nonbessemer hematite having a distinctly brownish cast. An average analysis is, natural, iron 50 per cent, phosphorus 0.075, silica 8.0, manganese 0.75, alumina 2.6, sulphur 0.015, loss on ignition 5.63, and moisture 10.0.

This analysis, especially for a Marquette range ore, is unusual in its high manganese and high loss on ignition. Other outstanding elements are the low silica and low moisture.

Physically, the ore is crushed in the mine headframe to a maximum size of 2½ inches, an ideal size for furnace use. Commercial shipments of this grade were made by the North Range company since its acquisition in November.

Tax Spenders' Halcyon Days Pass; Ore Firms Let State Sue

BY A. J. HAIN
Associate Editor, STEEL

SOMETIME in March or April this year, in a court of law in St. Louis county, Minnesota, Lake Superior iron ore producers and the state's tax authorities are coming to grips over the long dispute concerning the taxation of mining property.

For years the iron ore companies protested to the people, to local councils, to county and state commissions, against extravagance in public expenditures in communities where those companies pay the bulk of taxes.

As long as they were able to pay they received scant attention. At length the time arrived, however, when they defaulted. For the year 1932—when iron ore shipments from the state amounted to only 2,300,000 tons—the iron mining companies' tax was $17,000,000, of which $14,000,000 represented tax on real estate. Half the $14,000,00 was payable last May; the other half, last October.

The first half-year tax was paid, but on the second-half the iron ore companies defaulted to the extent of $1,900,000, the United States Steel Corp.'s portion of this being $1,729,407. Under the law, failure to pay leads immediately to action by the state to collect. It is this suit which will be contested this year, and which is likely to go to the state supreme court.

Though the mining companies have taken care of all their employes during the depression, their failure to pay all their taxes surprised the range public officials. The latter drafted a petition and presented it to Gen. Hugh S. Johnson when he was in their state, claiming the default was a violation of the NRA. The petition pointed out that the mining companies pay 94 per cent of the taxes in St. Louis county.

Unless all the mine taxes are paid, the petition stated, "community bankruptcy will result . . . units of government which have carried almost the entire burden of public relief will immediately disintegrate . . . the situation is so severe and the result desired by the tax strikers is so clearly a direct violation of the NRA we implore you to give this immediate at-

tention to the end a calamity be averted."

Needless to say, General Johnson did not give the petition the consideration the officials believed it deserved. If he had gone to the Mesabi range cities, and made the most casual inspection he would have found the mining companies providing work merely to keep employes busy, paying for food and shelter for those who were unemployed.

He would have found in these range communities, within a stone's throw of miners' cottages, some of the most magnificent public buildings in the Middle West. High schools that cost $4,000,000 to $5,000,000, for communities of 15,000 to 20,000 population; a municipal auditorium costing $2,000,000 practically every range city with an American Legion auditorium—built by the public officials with tax money, to demonstrate their patriotism.

Clock Cost $14,000

He would have found a clock in one range city that cost $14,000; a plain flag pole that cost $8000; a champion hockey team which cost one range city of 7000 a total of $33,000 in ten months; a baseball team that cost nearly as much, with a pitcher just out of a big league, down on the payroll for $275 a month.

He would have found in another town school house chandeliers which cost $3500 each; a printing press at $5000 that never was uncrated; a pipe organ for which taxpayers paid $15,000; pin setters on payrolls of municipal recreation halls at $125 to $150 a month.

STEEL has pointed out on numerous occasions evidences of extravagance in public buildings and payrolls in range towns of Minnesota. The mining companies have "implored" the town councils to cut their budgets, but save for some reductions in payrolls in recent years, their appeals have been unavailing. Indeed, the burden in many instances has been piled up in the form of bond obligations against property, from which apparently there is no escape.

While the range politicians have mulcted the mining companies to erect monumental buildings, and make other lavish displays of community "prosperity," they have not succeeded in putting more money into the pockets of the miners. Money that might have gone to the latter has been diverted to paying the tax bills. Close to these fine structures in many range towns miners live in dilapidated frame cottages.

Within the village of Buhl, one observer points out, there is a natatorium, the like of which one sees only in the movies. Across the road there is a three-room company house. The tax money spent on the Buhl pool, it has been estimated, would pay for a bath tub for every home in the village. Evidently, the species of socialism rampant on the Minnesota ranges has not worked out to the material benefit of the citizens; they have fooled themselves; or rather permitted the politicians to fool them.

From 1925 to 1929, inclusive, the net profit on ore shipped from Minnesota, including the fee owners' royalties, was $166,666,000; the taxes were $105,351,000, and the shipments amounted to 203,907,000 tons. This covered the period of the industry's greatest prosperity.

Property taxes for the year 1932, paid in 1933, were only slightly under the peak of the year 1929. The taxes for 1933 which now are being assessed will exceed those for 1932.

In the past ten years in Minnesota the mining companies' total tax bill has averaged more than $20,000,000 per year. As an average, during any year in this period, every time a train of 100 cars of iron ore left the mine the tax paid by the shipper was equivalent to the total gross receipts on 23 carloads. In other words, of every 100 cars shipped the producer could just as well uncouple 23 carloads and leave them for payment of taxes, and content himself with the profit he could realize on the remaining 77.

Twenty-three per cent of the gross value of the ore at the mine is paid in the taxes to the state and local communities, while the mining industry in the United States as a whole pays only 2.3 per cent of the gross value of its product for state and local taxes. In 1933 the taxes in Minnesota represented about 50 per cent of the gross value of the ore shipped.

Examples of High Taxes

For the ten-year period the tax paid by the mining companies is equivalent to 63 per cent of the total net profit on the ore, to both the fee owners and mining companies. For 1933 the tax equals more than 100 per cent of such profit. The mining district contains only 3 per cent of the state's population, yet pays 14 per cent of all state and local property taxes.

The average tax paid per capita in the mining district is about $234, whereas the average property tax in the remainder of the state is $41; and in the United States, $47. For the year ended in June, 1933, the range school districts spent $207 per pupil compared to less than $100 per pupil expended by comparable school districts elsewhere in the state.

Tax expenditures in most Mesabi range iron communities are excessive by any standard of comparison. In the nonrange communities where the tax spenders are elected by the tax payers, thrift prevails. On the Mesabi range where the mining companies pay almost the entire tax levy, and have little voice in tax spending, extravagance is the rule.

For the five years 1927 to 1931, taxes in the mining regions of Minnesota amounted to $21,518,000 a year. Of this sum the mining communities paid all but $1,087,000.

Typical comparisons of Mesabi range communities with nonrange communities of similar population show startling differences.

On figures compiled from a statement issued by the Minnesota tax commission for the year 1932 on local levies only, not including state, county or school levies, the village of Hibbing with about 16,000 population levied more taxes than the combined total of six other large communities in Minnesota with a total population of 102,000.

The average per capita levy in Hibbing was $100 for local purposes, excluding school, as against about $13 average in the six other similar communities.

Buhl Rate $100 Per Capita

The village of Buhl, with 1600 population, levied $100 per capita for local purposes, as against $11 per capita average of off-range communities of similar size. Any comparison with nonmining communities show the same differences.

These are a few comparisons tax authorities will have to face in court.

In Michigan a real appreciation of the unusual tax burden imposed on the industry has been evidenced by the local communities, with the result that they are co-operating to reduce unnecessary expenditures. For 1933 the iron ore tax bill in that state will be reduced approximately 35 per cent; though the per capita tax in the ore districts still is much higher than in similar nonmining communities.

According to R. C. Allen, president, Lake Superior Iron Ore association, who appeared recently before the interstate commerce commission in an endeavor to bring about some reduction in freight rates on ore, the industry "has given away" in higher taxes, wages and railroad freight practically all the benefits resulting since 1913 from improvements in mine mechanization, management and organization.

In these 20 years labor costs rose 58 to 70 per cent—even before the industry increased wages 15 per cent, under the NRA, in July last year. Freight rates have doubled; taxes have gone up 200 per cent, while the price of the ore at the mine has remained practically unchanged.

Doubling of the output per miner is ascribed to the development of mechanical devices, and to organization. Markets for iron ore have suffered through the greater use of scrap and high rail transportation, the eastern markets being practically closed to lake ore because of freight rates.

Iron ore prices today are generally regarded in the industry as satisfactory, if volume can be obtained; without that prerequisite, it is said, prices must rise.

Co-operation Is Key to Scrap Problems Under New Deal

THREE major problems facing this country today are: The working man without a job; the business man without a business; and the farmer without an income. Those who approach the national industrial recovery act—one of the principal measures designed to solve these problems—with tongue in cheek, are seriously underestimating fundamental changes that affect our economic system today.

It appears that "partnership with government" is no mere figure of speech, because government will continue to protect its taxation reserves in the profits of industry. Furthermore, no matter what changes are made in the form of NRA, a new element has been introduced into law—"the public interest"—which will be stretched by the courts in the future to cover many phases of our economic life, just as has been done similarly with the constitutional phrases "interstate commerce" and "due process of law," in protecting the rights of government and the public in those fields which until now have been thought by businessmen as exclusively their own, to do with as they pleased.

How To Meet Rising Costs?

NRA has imposed obligations no less burdensome on the scrap iron industry than on other branches of industry. Operating under a 40-hour week with a minimum wage of 37½ cents per hour, scrap iron dealers in many section of the country have been compelled to increase their labor costs by more than 100 per cent.

Although the law implies a right to compensate themselves in the prices received for their products, this is beyond the control of the scrap dealer, since scrap prices are subject to the dictates of consumers and in accordance with the law of supply and demand. Furthermore, a dealer cannot compensate himself freely by reducing the price which he pays for his scrap before preparation, because if this price is forced too low, sources of scrap will vanish.

DIFFICULTIES confronting the scrap industry and suggestions for their solution are presented in the accompanying article, prepared for STEEL by Benjamin Schwartz, director general, Institute of Scrap Iron and Steel Inc., New York.

With increased labor costs and with freight rates fixed, the scrap iron dealer furthermore is faced with marked changes in the operations of his business. Profits have narrowed down to a small margin, particularly on standard grades of scrap. Buying methods of steel mills have prevented wide spreads in prices, which formerly provided an opportunity for speculation. Scrap specifications have become stricter in interpretation.

An undercurrent of conflict in the trade divides the old school that believes in traditions and speculation, and the modern dealer who understands that the narrow margin of profit available today can be made only by continually moving the scrap and merchandising it, and not by accumulating it; who understands that a knowledge of costs and the metallurgical requirements of his customers is necessary equipment for a scrap seller.

Many steel mill executives have remarked to me: "Scrap is the only raw material involved in the manufacture of our steel about which we have any concern. We cannot estimate scrap costs in advance; and we must establish an inspection service, not required in connection with our other raw materials. Why can't we buy our scrap as we do other raw materials?" My answer invariably is that it can be done, provided the same formula which President Roosevelt has urged for the correction of inequalities and injustices in our economic life, also is applied to the problems of the scrap iron industry —co-operation!

The uncertainties in connection with the marketing of scrap, which occasionally lead a steel mill to gamble with its inventory, result entirely from a lack of mutuality in contractual relations between scrap iron dealers and consumers of scrap; and a lack of understanding and appreciation on the part of the consumers of scrap of the important services scrap iron dealers render to the steel trade.

A Nation-Wide Industry

The two principal raw materials that enter into the manufacture of steel are pig iron and scrap. The average percentages in the open-hearth melt are approximately 60 per cent scrap and 40 per cent pig iron. Scrap, as the principal raw material of the steel industry, is obtained through a national collection machinery and organization, normally involving approximately 200,000 people, which intensively covers the industries and the agricultural districts of the United States. The bulk

of scrap materials is bought and sold in free and open markets, usually on a competitive basis. During the last few years, however, certain steel companies have entered into reciprocal arrangements with their customers who buy steel from them, in which the scrap, resulting from their operations, is returned directly to the steel company.

These reciprocal agreements comprise a weapon of unfair competition among steel mills. They involve a form of rebating on the price of finished steel and are in restraint of trade because other steel mills are pre-empted from competing fairly in the sale of steel when one favored steel company is able to tie up the scrap of any consumer of steel.

When a scrap dealer sells a tonnage of scrap to any steel mill, the sale is subject to definite specifications as to the size, quality and the like, strictly interpreted; subject to rejections or reductions on the price of scrap, after the freight car arrives at the steel plant, such rejections and reductions depending upon many factors, some beyond the control of the scrap dealer. Contracts made with scrap dealers frequently are subject to suspensions of shipments, depending upon market conditions and upon other factors which have nothing to do with acts of God, embargoes, or acts beyond the control of either the steel mill or the scrap shipper.

Discrimination Often Unfair

On the other hand, when scrap is taken back directly from the customer of a steel mill, whether by means of a reciprocal arrangement or not, such scrap is not always subject to the same rigid interpretation of specifications, to the same hazards of rejections or suspensions of shipment. Such discrimination is unfair to the scrap dealer, who is expected to supply the bulk of the raw materials of the steel industry.

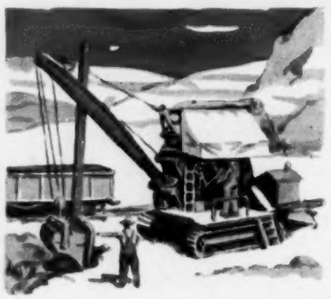
Scrap is the only commodity used in the steel industry which today still is responsive to the law of supply and demand, operating in open markets. The attempt of certain steel companies to tie up large tonnages of scrap by direct deals with their customers is tending to prevent the operation of free markets in which the best interests of all steel companies are protected.

One purpose of these direct deals is to eliminate the scrap dealer and to enable certain companies to secure a monopolistic control over their raw materials, to the detriment of steel companies entitled to economic sources of supply, purchased in an untampered open market.

Conservation of natural resources is not only a fixed policy of the government, but is also one of the purposes contained in Title I of the national industrial recovery act. The service of the scrap dealer is a direct contribution to the conservation of natural resources, because for every ton of scrap which he collects, properly prepares and distributes to a steel mill, two tons of iron ore and three tons of coal, limestone and other natural resources, or a total of five tons of natural resources, is conserved for future generations.

This point is emphasized by two facts: First, government authorities recognize that available iron ore reserves are limited and should be conserved as a first-line natural resource. Second, the use of approximately 40,000,000 tons of scrap by the steel industry in 1929, for example, conserved approximately 200,000,000 tons of iron ore.

Increase of direct dealing between steel mills and their customers is



causing disintegration of collection machinery of the scrap iron industry. This industry cannot maintain its function of conserving natural resources if a large part of its business is taken away in unfair competition.

Indications are that the requirements of the steel industry in the next ten years will demand larger percentages of scrap. If the scrap iron industry is disrupted by reciprocal deals or other restrictive practices on the part of the steel industry, many millions of tons of scrap, which otherwise might be made available to the steel industry, cannot be collected and the alternative will be for the steel industry to dig further into its iron ore reserves in the future.

For scrap interests, the instrument of co-operation with NRA and with the steel industry is the Institute of Scrap Iron and Steel. The institute has been recognized by scrap iron dealers, in view of the fact that approximately 400 of them, representing over 90 per cent of the tonnage of scrap shipped to the steel industry, are members of the organization. The institute has been recognized by the federal trade commission, which in 1929 held a trade practice conference for the scrap industry, out of which developed a code of business practices under the administration of the institute. It has been recognized by NRA as representative of the industry, in view of the fact that the institute will be named in the scrap iron code, now awaiting the signature of President Roosevelt, as the responsible agency for the selection of the code authority.

Organized in 1928, the institute is the only national trade association in the history of the scrap business that has continued for more than five years on a firm foundation. Those who are acquainted with difficulties of the personnel and the problems of the scrap trade, and who have seen attempts at organization made in the last thirty years disappear within a few months, can appreciate the stability of the institute.

For over five years the institute has tried to place the scrap iron industry on the highest possible plane of commercial relationship with its customers, of understanding by the public and of fair competition within the trade. This is said with all due respect to many individual scrap dealers who have been able to handle their business and relations with customers, competitors and the public, without the aid of any trade association.

Institute's Work Lauded

Sometime ago the officers of a large steel corporation were gathered in executive meeting. They had given careful consideration to their scrap policies. Among many matters to be acted upon at the meeting was a proposal that in effect would have put the company into the scrap iron business. During the discussion, one of the officers made the following statement, which helped to defeat the proposition before the committee:

"It seems to me that we have to reckon with a new factor in the scrap iron industry today, which did not exist in the past. That new factor is the Institute of Scrap Iron and Steel. During a short period this institute has accomplished one thing which many of us felt would be difficult to eliminate. Through the co-operation of the federal trade commission and through its own educational enforcement work, it has practically eliminated the practice of 'top-dressing' cars of scrap.

"We have been the beneficiaries of this work, as well as the rest of the steel industry. If that organization has been successful in accomplishing this task, we have every reason to believe that it will succeed in the balance of its program for the stabilization and improvement of the scrap iron industry. If the institute succeeds in its work, we in this steel corporation should have no incentive to go into the scrap iron business."

THE BUSINESS TREND

Curbed Twice in 1933, Business Drives for Recovery in 1934

JAN. 1, 1934, finds business struggling in an environment strangely different from that of a year ago. Circumscribed on all sides by the ramifications of the most elaborate program of depression relief, social reform and economic experiment ever attempted by the government of a democracy, business today is engaged in its third drive for recovery from the low point touched in July and August of 1932.

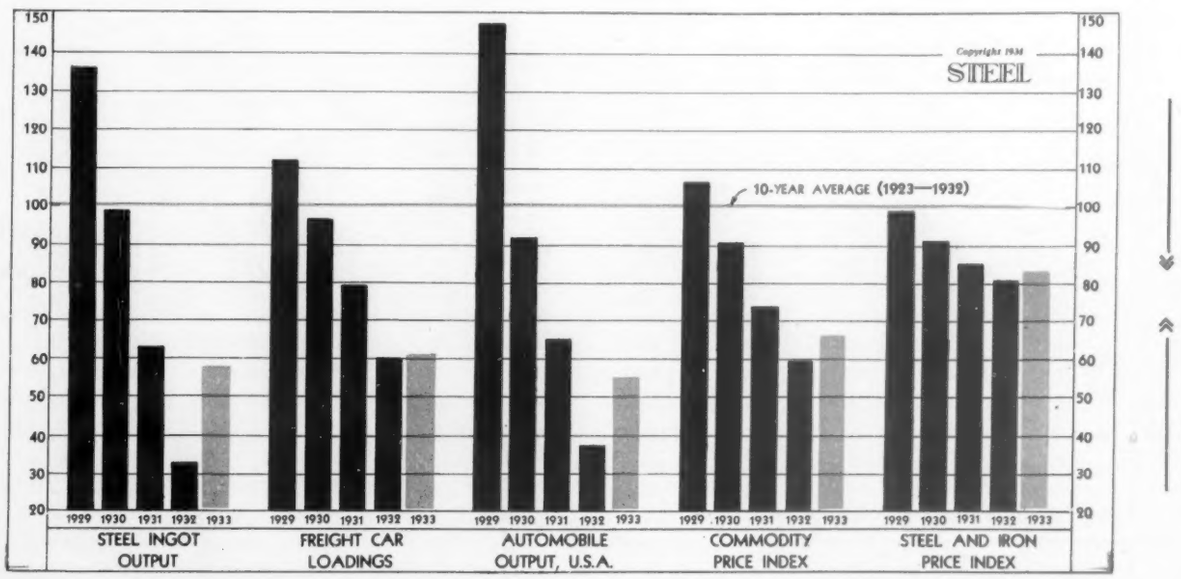
The first of these was the ill-fated upturn in the third quarter of 1932. Although imperiled by election uncertainties and the depressing influence of a lame-duck congress, the movement rallied in January and February of 1933, only to fall a victim to the national banking crisis in March.

The second drive was the most spectacular in the annals of business. Gaining its stride on the rebound from the bank holidays, business improved from March to July at an unprecedented rate. The index of industrial production leaped 66 per cent in that brief period. Steelworks operations increased 280 per cent and steel ingot output 252 per cent! Wholesale commodity prices gained about 35 per cent.

But the miracle was too good to last. The country had over-reached itself. It had banked too heavily on the expectancy of inflation. Also, the uncertainty of government reform and experiment became a factor. By August a severe relapse was underway—a relapse which slowed in October, and came to a standstill in November.

December ushered in the third movement, which, at the dawn of the new year, is well defined and gaining strength. How far it will go and what its outcome will be in the hands of the fates of 1934.

Whatever the future may bring forth, 1933 will be recorded as an epochal year in business history. In its brief span of 12 months were crammed more events of great importance than normally are alloted to a decade. Yet in spite of its cyclopean upheavals, business managed to keep its bearings, to adapt itself to new concepts, to do a greater volume of business than in the preceding year and to make definite progress toward recovery.



The Statistical Record of 1933 in Tabloid

	1 Industrial Production Adjusted Index	2 Employment in Mfg. Industries Index No.	3 Car Loadings Weekly Ave. 1000 Cars	4 Electric Power Production Daily Million K-W-H	5 Wholesale Comm. Prices Bradstreet's Index Dollars	6 Steel, Iron Prices, STEEL'S Composite Dollars	7 Commercial Failures Dun's Number	8 U. S. Steel Corp. Quarterly Net Income 1,000,000 Dollars	9 Railroads Class 1 Net Income 1,000,000 Dollars	10 Shipments Fin. Steel U. S. Steel Corp. 1000 G. Tons	11 Pig Iron Monthly Output 1000 G. Tons	12 Steel Ingots Monthly Output 1000 G. Tons
January	65	56.6	478	222.9	6.79	28.68	2,919	.....	13.27	285	569	1,030
February	63	57.5	489	222.3	6.53	28.31	2,378	.....	9.85	276	553	1,087
March	60	55.1	460	215.0	6.35	28.35	1,948	—16.73	10.55	257	542	910
April	67	56.0	501	215.0	6.54	28.16	1,921	.....	19.04	335	624	1,363
May	78	58.7	532	224.7	6.98	28.45	1,909	.....	40.69	455	892	2,002
June	92	62.8	566	240.2	8.02	28.73	1,618	— 8.63	59.48	604	1,265	2,598
July	100	67.3	622	240.7	8.34	29.81	1,421	.....	64.31	701	1,801	3,204
August	91	71.6	626	246.6	9.01	30.04	1,472	.....	60.98	668	1,833	2,901
September	84	73.9	641	244.8	8.99	31.30	1,116	— 2.72	60.94	575	1,508	2,311
October	77	74.0	651	241.6	9.05	31.59	1,206	.....	57.26	573	1,359	2,112
November	....	....	592	.....	8.84	31.59	1,237	.....	.....	430	1,084	1,541
December	....	....	....	.....	8.81	32.42	....	.....	.....	....	.....	....
Ave., 1933	78	63.4	559	231.4	7.85	29.83	1,743	— 9.36	39.82	469	1,095	1,914
Ave. same period, 1932	64	60.4	547	225.8	7.10	29.46	2,669	—18.18	26.06	341	682	1,133
Ave. 12 mos., 1932	64	60.1	543	226.6	7.10	29.46	2,652	—17.82	27.23	331	723	1,110
Monthly Ave. for 10 years	99	91.0	903	216.4	11.86	36.50	1,989	+23.80	80.35	647*	2,678	3,306

*Monthly average, 1930-1932, inc.

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	13 Bitum. Coal Monthly Output 1,000,000 Net Tons	14 Coke Monthly Output 1000 Net Tons	15 Steel Castings Monthly Output 1000 Net Tons	16 Mall. Castings Monthly Output 1000 Net Tons	17 Gray I. Castings Ave. Output Per Fdry. Net Tons	18 Fab. Str. Steel Monthly Orders 1000 Net Tons	19 F. Plate Work Monthly Orders 1000 Net Tons	20 Steel Sheets Monthly Output 1000 Net Tons	21 Steel Sheets Output Per Cent of Capacity	22 Steel Furniture (Business) Monthly Orders $1000	23 Steel Barrels Monthly Output 1000 Units	24 Railroad Track Work Output 1000 Tons
January	27.06	1,866	13.9	12.6	62	73.7	11.1	85.3	25.9	552	292	2.0
February	27.13	1,723	12.4	13.6	69	50.9	16.6	91.7	27.8	449	270	1.8
March	23.69	1,759	13.2	9.8	65	71.4	8.9	64.7	19.6	419	373	2.0
April	19.52	1,703	12.1	17.9	68	46.1	9.5	111.9	34.5	447	401	1.7
May	22.49	1,969	19.1	24.6	99	42.6	16.2	139.7	43.1	544	465	1.8
June	25.32	2,292	27.3	31.1	122	81.9	37.0	166.3	51.2	686	573	2.5
July	29.48	2,866	29.2	30.9	141	56.5	20.1	188.1	58.0	607	555	3.0
August	33.85	2,994	31.2	31.8	**	78.4	16.3	203.9	62.8	837	481	3.4
September	29.50	2,772	25.5	27.1	**	57.6	16.0	180.3	55.5	869	519	3.8
October	29.66	2,559	25.5	24.4	**	53.5	17.8	146.1	45.0	800	799	3.0
November	30.44	....	....	....	**	....	....	.....	....	....	...	....
December	.....	.....	.....	.....	**	....	....	.....	.....	.....	.....	.....
Ave., 1933	27.10	2,250	20.9	22.4	89	61.3	17.0	137.8	42.3	621	473	2.5
Ave., same period, 1932	24.96	1,823	15.0	15.2	70	75.1	14.4	95.3	25.2	675	425	2.4
Ave., 12 mos., 1932	25.47	1,828	12.8	14.3	70	79.0	13.5	93.4	25.1	660	410	2.3
Monthly ave. for 10 years	40.39	3,976	72.2*	53.4	147†	220.0	38.2	242.1	74.9	1,306‡	538°	11.6

*Monthly average, 1926-1932, inc. **Statistics Discontinued Temporarily. †Monthly average, 1929-1932, inc. ‡Monthly average, 1930-1932, inc.
°Monthly average, 1924-1932, inc.

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	25 R. R. Cars Monthly Awards Units	26 Auto's U. S. A. Monthly Output 1000 Units	27 Building Construction Monthly Awards Million Sq. Ft.	28 Machine Tools Monthly Orders Index No.	29 Foundry Equip. Monthly Orders Index No.	30 Electric Overhead Cranes Monthly Orders $1000	31 Steel Boilers Monthly Orders Units	32 Shipbuilding Completed 1000 Gross Tons	33 Iron and Steel Foreign Trade Exports 1000 Tons	34 Steel Trade Imports 1000 Tons	35 U. S. Foreign Trade Merchandise Exports Million Dollars	36 Trade Imports Million Dollars
January	3	130.0	8.45	31.6	68.4	13	197	15.9	56.7	21.9	120.6	96.0
February	0	106.8	7.38	15.2	16.1	21	176	9.3	63.9	19.7	101.5	83.7
March	5	117.9	10.39	13.4	9.8	39	193	41.2	80.6	22.1	108.0	94.9
April	50	180.7	10.87	16.2	19.4	39	235	2.9	100.4	28.1	105.2	88.4
May	8	218.3	15.28	27.6	25.7	33	328	9.5	123.2	26.3	114.2	106.9
June	500	253.3	16.08	39.8	45.5	81	511	2.8	102.6	34.4	119.9	122.0
July	306	233.1	15.01	53.9	48.6	159	498	5.3	88.3	52.8	144.2	143.0
August	202	236.5	13.00	57.4	56.2	43	511	5.7	119.4	46.8	131.0	155.0
September	23	196.0	13.38	55.8	34.9	77	447	2.8	108.8	55.7	160.0	147.0
October	514	138.5	15.53	67.1	23.2	43	398	5.2	164.8	46.7	194.0	151.0
November	533	.....	.....	82.8	36.6	..	...	...	.....	....	.....	.....
December	....	.....	.....	....	....	..	....	....	.....	....	.....	.....
Ave., 1933	195	181.1	12.54	46.1	38.4	55	349	10.1	100.9	35.5	129.9	118.8
Ave. same period, 1932	153	120.6	13.51	38.2	19.5	46	313	16.7	48.5	31.4	134.3	112.1
Ave. 12 mos. 1932	145	114.2	12.92	35.4	19.3	42	304	17.9	49.6	31.5	134.2	110.2
Monthly Ave. for 10 years	5,510	303.6	56.87*	143.3	118.1	675	1,113**	21.6	156.5	48.5	346.4	293.4

*Monthly average, 1925-1932, inc. **Monthly average, 1927-1932, inc.

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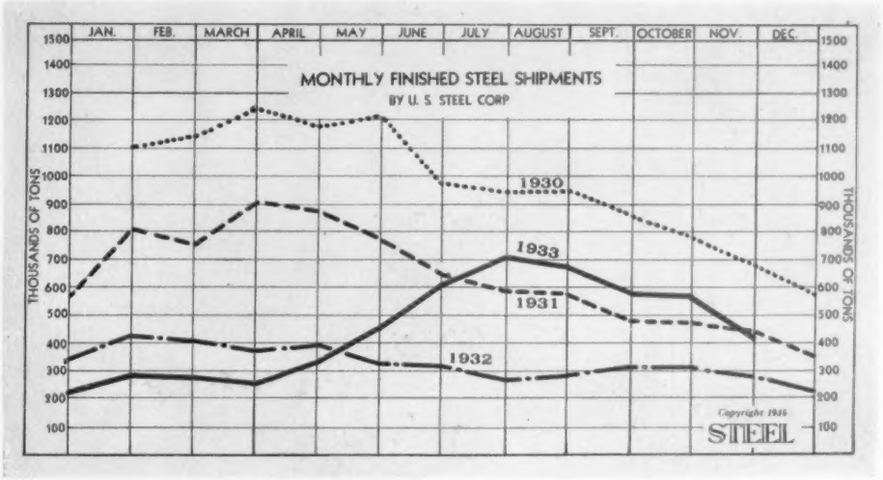


NRA outmoded the long series of statistics on unfilled orders of the United States Steel Corp.

It was replaced by a new series on shipments of finished steel, the four-year record of which is shown here

Gains of 1933 Give Industry Good Start for New Year

OUTSTANDING in the record of business for 1933 is the fact that for the first time since 1929 improvement over the preceding year was registered.

The contrast of today's situation with that of a year ago is sharply defined. Last year in this column we reported that of the 36 business factors, for which statistics are presented on the opposite page, "not one affords a favorable showing in 1932 compared with 1931." Today almost the reverse is true. Of the 36 indicators, 31 show improvement in 1933 over 1932.

The 36 series of statistics are readily divided into five classifications—production of materials; output of fabricated material, machinery, equipment and manufacturers; financial; prices; and general indices.

In the first group—materials—sharp gains were reported all along the line. The output of pig iron, steel ingots, finished steel, coal, coke, castings and steel sheets was greater in 1933 than in the preceding year.

Exceptions in Heavy Industries

In the second group, embracing fabricated products, machinery, equipment and manufactures, the record was not uniformly favorable. Gains were made in fabricated plate work, steel barrels, railroad track work, freight cars, automobiles, machine tools, foundry equipment, electric overhead cranes and steel boilers. However, losses were recorded for fabricated structural steel, steel furniture, building construction and shipbuilding.

The financial showing was decidedly encouraging. Commercial failures were fewer than in many years. Steel company losses generally were reduced, U. S. Steel cutting its deficit in three quarters from an average of $18,180,000 per quarter in 1932 to an average of $9,360,000 per quarter in 1933. Net income of Class 1 railroads averaged $39,820,000 per month in 1933 as against $26,000,000 in 1932.

Price averages in the past year exceeded those of 1932 by narrow margins. Bradstreet's index of wholesale commodity prices was 10 per cent above the previous year's average. STEEL's composite of iron and steel prices was only 1.25 higher than in 1932. At the beginning of 1934 iron and steel prices are tending upward; commodity prices are wavering uncertainly.

Most Industries Registered Gains

The general indices all showed improvement in 1933 with the exception of merchandise exports. Industrial production, freight car loadings, electric power production and employment started slowly in 1933, gained rapidly in the mid-year, tapered off in the fall, but closed the year with modest gains.

Significant in the compilation is the relatively poorer showing of the "heavy" industries and of the building construction field. The record clearly bears out the contention that the recovery program thus far has under-rated the need of stringent remedial action in this area of industry.

In the main, business, as revealed by these barometers, made distinct progress toward recovery in the past year. The outlook for 1934 is promising, but allowance must be made for the artificial character of government support. Not until industrial activity is maintained more by private investment and less by federal borrowings will business regain the smooth, sound highway to stability.

Peaks and Valleys in the Major Postwar Depression

Key:

1929

1. March 4—Herbert Hoover inaugurated.
2. Oct. 29—Crash in New York stock market.
3. Nov. 21—President confers to stabilize business.

1930

4. May to November—Revolution in South America; unrest in Central Europe with widespread financial difficulties, etc.
5. August—Acute drought in Middle West.
6. Dec. 2—President outlines recovery plan.
7. Dec. 11—Bank of United States closes.
8. Dec. 20—President signs first relief bill.

1931

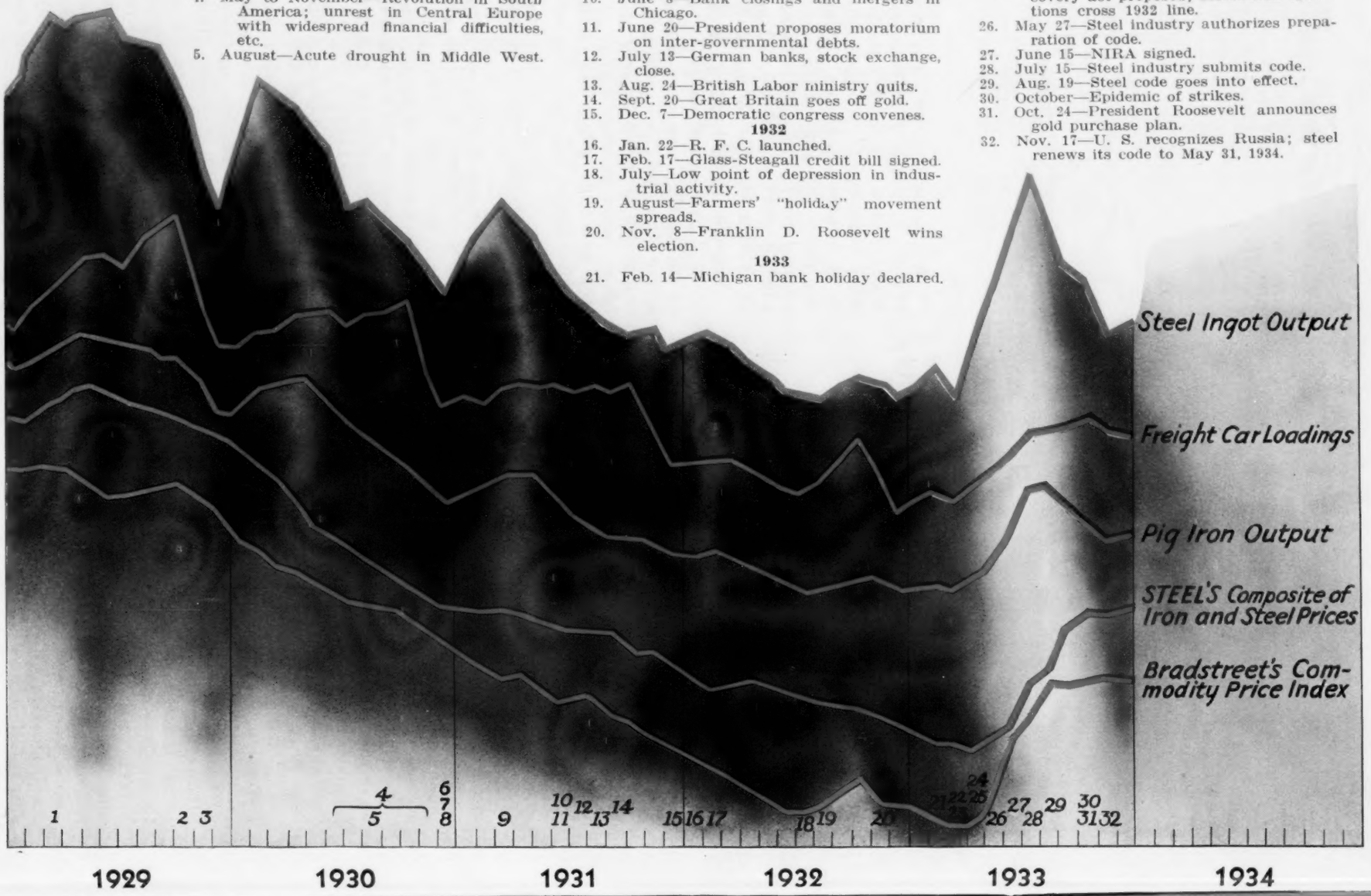
9. March 21—First-quarter business revival collapses.
10. June 8—Bank closings and mergers in Chicago.
11. June 20—President proposes moratorium on inter-governmental debts.
12. July 13—German banks, stock exchange, close.
13. Aug. 24—British Labor ministry quits.
14. Sept. 20—Great Britain goes off gold.
15. Dec. 7—Democratic congress convenes.

1932

16. Jan. 22—R. F. C. launched.
17. Feb. 17—Glass-Steagall credit bill signed.
18. July—Low point of depression in industrial activity.
19. August—Farmers' "holiday" movement spreads.
20. Nov. 8—Franklin D. Roosevelt wins election.

1933

21. Feb. 14—Michigan bank holiday declared.
22. March 3-5—General bank closings; inauguration; declaration of national bank holiday.
23. March 27—Beer legalized.
24. April 6—Senate passes 30-hour bill.
25. April 21—United States goes off gold; recovery act proposed; steelworks operations cross 1932 line.
26. May 27—Steel industry authorizes preparation of code.
27. June 15—NIRA signed.
28. July 15—Steel industry submits code.
29. Aug. 19—Steel code goes into effect.
30. October—Epidemic of strikes.
31. Oct. 24—President Roosevelt announces gold purchase plan.
32. Nov. 17—U. S. recognizes Russia; steel renews its code to May 31, 1934.



Panorama of Five Years Shows Business Upturns and Recessions

Panorama of Five Years Shows Business Upturns and Recessions

EVENTS of 1933 seemed to confirm the earlier belief that the low point of the present postwar depression was passed in July 1932. At any rate, the past year helped to define the contours of the business trend, making it possible for the first time to view the fluctuations of the past four years in orderly perspective.

In the light of present knowledge, the high peaks of 1929 loom as heights of folly, from which business—with occasional brave attempts to regain ground—descended lower and lower until it found bottom in the broad valley of 1932. Against this three-year dark panorama of decline, the shiny peak of 1933 stands in sharp contrast—a contrast only partially dimmed by the August-November relapse.

* * *

THE stock market crash of Oct. 29, 1929, signalized the toppling of a top-heavy speculative structure. Its real significance was not generally realized. When, in early 1930, the trend of business started to rise again, optimists declared complacently that the worst was over. But they did not reckon with the terrific effects of unrestrained speculation. From May to November in 1930 the entire world was disturbed by revolution, insolvency, repudiation and unrest. The points of acute trouble were in South America and Central Europe.

On Dec. 11, 1930, closing of the Bank of the United States, in New York, drew attention to the banking situation in this country. The growth of domestic troubles also was reflected in the relief bill enacted on Dec. 20—the first relief legislation of the depression.

Notwithstanding signs of impending danger abroad, American business gained encouragingly in the first three months of 1931. The spurt was short-lived; it collapsed late in March and was followed by evidences of more acute financial trouble at home and abroad. By June 8, the banking situation in the Middle West was alarming. Conditions in Central Europe were at the breaking point. In an effort to stem the tide of disaster, President Hoover, on June 20, proposed his famous moratorium on intergovernmental debts.

Unfortunately this and other efforts were ineffectual. On July 13 Berlin banks and stock exchanges closed. The reverberations were felt all through Europe and in England. On Aug. 24 the British Labor ministry quit and by Sept. 20 Great Britain was forced to abandon the gold standard. Many other countries followed its example.

By this time, complete disillusionment had descended upon the American public. The seventy-second congress, convening Dec. 7, was ruled by a Democratic majority. The Republican administration was shaping remedial legislation.

Under the whip of increasing domestic woes, Washington on Jan. 22, 1932, launched the Reconstruction Finance Corp. On Feb. 27 the Glass-Steagall credit expansion bill was passed. The tension was eased slightly, and in August, when the first feeble gains from July were evidenced, there was a feeling in some quarters that at last the real turning point of the depression had arrived.

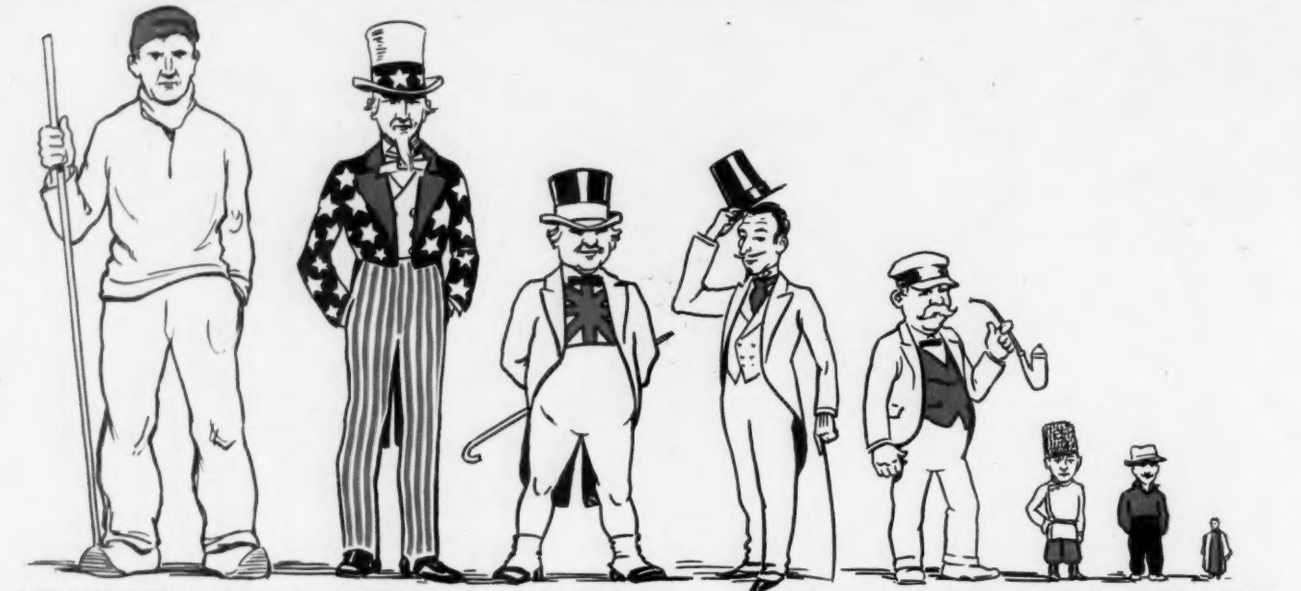
Again the upturn was of short duration. Election was approaching. Uncertainty increased. Before the votes which elected Franklin D. Roosevelt were cast, business was well on its way to another recession, which continued unbroken practically to the end of the year.

January and February of 1933 witnessed business driving ahead bravely in spite of the depressing influence of the last lame duck congress and of an administration which had been repudiated at the polls. Into this situation was injected on Feb. 14 the Michigan bank moratorium. In the face of extraordinary efforts to localize its effect, financial fear spread like wildfire. By March 3 the entire country was at its mercy, and the first act of the new President was to declare a national bank holiday.

The rise from March, the "new deal" in all of its ramifications, abandonment of gold, etc., are of such recent occurrence that it is not necessary to recount them here. Sufficient it is to say that from March to July business gained more rapidly than in any period of equal span, and that the inevitable result of a too rapid climb came in the form of a decline extending from August to November.

* * *

AT THE dawn of 1934 business again is climbing. To what heights and at what rate are for the new year to reveal. The immediate outlook is promising; the long range view obscured by the uncertainties of unprecedented experiment.

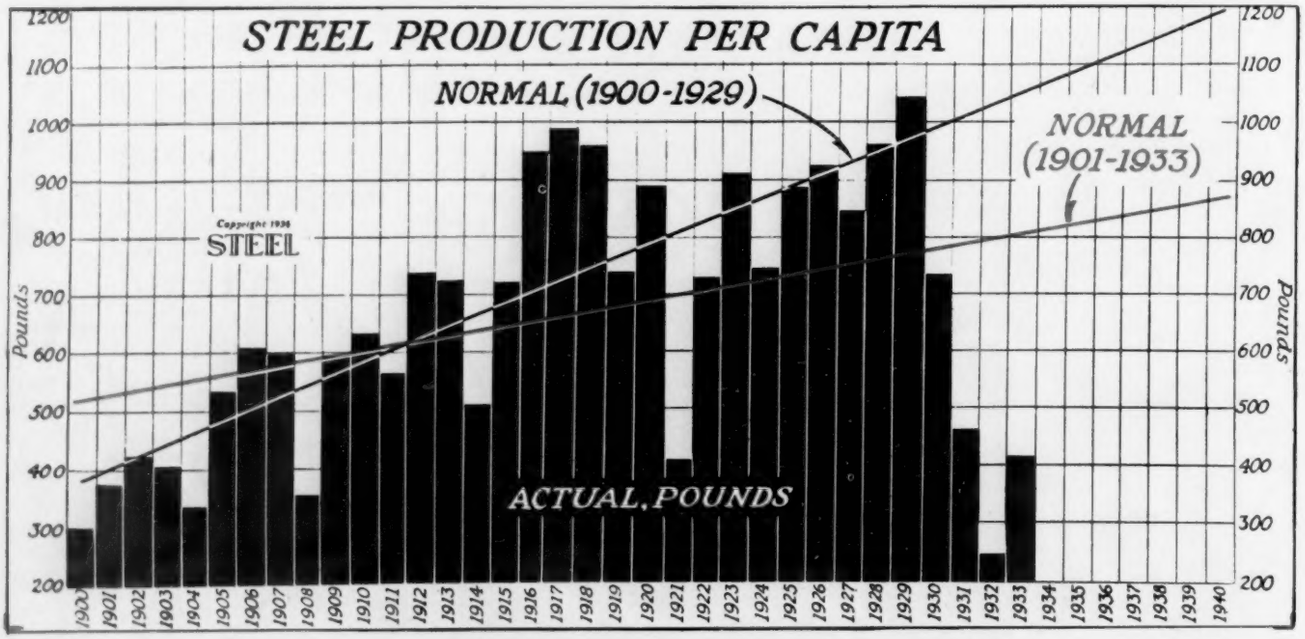


Belgium-Luxemburg Lead in Per Capita Use of Steel

TINY Belgium-Luxemburg may be just a wedge geographically in northwest Europe, but these industrial Siamese twins lead the world in per capita consumption of steel—which is domestic production plus imports minus exports, adjustment being made for scrap. Narrowly they nosed out the United States in 1933, but by a wide margin they topped the powerful nations flanking them on the Continent and John Bull across the Channel.

The score for the leading steel-producing countries last year, averaged per inhabitant, was: Belgium-Luxemburg, 418 pounds; United States, 410; Great Britain, 302; France, including the Saar, 301; Germany, 233; followed at a distance by Russia, 107; Italy, 94; Japan, 45.

The showing of Belgium and Luxemburg for 1933 is the more noteworthy considering that



How Depression Has Influenced Per Capita Trend Line

The black line was calculated in 1929, the red line at the end of 1933. The difference in the angles of incline represents the influence of the depression years

domestic production of steel ingots was only 4,460,000 gross tons, of which 3,210,000 tons was drained away by exports and replaced only to the extent of 325,000 tons by imports.

Next came the United States, its 410 pounds per person representing a 70 per cent gain over the 242 pounds of 1932. Per capita production, which does not give effect to foreign trade, was 411 pounds last year.

Great Britain, like France, Germany and Belgium, saw its average pulled down by excess exports, which in the case of Great Britain topped imports by almost 1,000,000 tons, France almost 2,500,000 tons and Germany 965,000 tons.

Incomplete data on foreign trade of Russia, Italy and Japan make per capita consumption of those countries vary a few pounds from the actual situation, but not sufficiently to change their relative position.

Per Capita Production in United States

	Population in thousands	Output Steel Ingots, Castings, gross tons, thousands	Output per capita, pounds	Pig Iron output in gross tons, thousands	Output per capita, pounds
1933	125,693	23,076	411	13,083	314
1932	124,822	13,500	242	8,800	158
1931	124,070	25,630	463	18,263	330
1930	122,775	40,278	734	31,441	573
1929	121,500	56,433	1,040	42,614	786
1928	120,013	51,544	962	38,155	712
1927	118,628	44,935	848	36,511	691
1926	117,136	48,294	924	39,372	752
1925	115,378	45,394	881	36,700	713
1924	113,727	37,932	746	31,406	618
1923	111,693	44,943	911	40,361	806
1922	109,893	35,603	726	27,219	554
1921	108,445	19,783	409	16,688	344
1920	106,422	42,132	887	36,926	777
1919	105,003	34,671	739	31,015	661
1918	103,587	44,462	961	39,054	843
1917	102,172	45,060	987	38,621	846
1916	100,757	42,773	950	39,434	876
1915	99,342	32,151	724	29,916	677
1914	97,927	23,513	509	23,332	533
1913	96,512	31,300	725	30,966	717
1912	95,097	31,251	736	29,726	700
1911	93,682	23,676	565	23,649	564
1910	92,174	26,094	634	27,303	663
1900	75,995	10,188	300	13,789	406
1890	62,948	4,277	152	9,202	327
1880	50,156	1,247	55	3,835	171

World Steel Production Is Up 31%, Pig Iron 23%

WORLD production of iron and steel in 1933 pulled out of the depression and snapped back to the level of 1923, largely because of the swift comeback of the United States and substantial gains by Great Britain, France, Germany and Russia.

At 65,281,000 gross tons, world output of steel ingots and castings was 31 per cent greater than the 49,836,000 tons of 1932. By way of comparison, the all-time record was 117,980,000 tons in 1929.

For pig iron, the total for 1933 was 48,083,000 gross tons, contrasted with 39,244,000 tons in 1932 and 96,729,000 tons in record 1929. Incidentally, the production of pig iron in 1933 was only 73 per cent of the output of steel—probably the lowest proportion on record.

Leading all nations, as for several decades, was the United States. Its total of steel ingots and castings in 1933 was 23,076,000 tons, 71 per cent greater than the 13,500,000 tons of 1932. In pig iron, the year's output of the United States was 13,083,000 tons, which was 58 per cent over the low of 1932.

The contribution of the United States to world production in 1933 was 35 per cent for steel and 27 per cent for pig iron. In other words, slightly more than one out of every three tons of steel tapped last year came from an American furnace or converter. This showing was moderately better than that of 1932.

In Europe, among the larger steel producing countries, Germany, Great Britain and France made good progress, with increases of about 30 per cent for the two former countries

World Production of Steel Ingots and Castings

Gross Tons

	1933	1932	1931	1930	1929	1928	1927	1926	1925	1913
United States	23,076,000	13,500,000	25,630,000	40,278,000	55,650,000	50,887,000	44,935,000	48,294,000	45,394,000	31,301,000
Canada	375,000	343,000	671,000	1,009,000	1,391,000	1,240,000	907,000	782,000	756,000	1,043,000
Great Britain	6,980,000	5,257,000	5,203,000	7,326,000	9,636,000	9,520,000	9,099,000	3,596,000	7,385,000	7,664,000
France	6,485,000	5,550,000	7,697,000	9,296,000	9,544,000	9,348,000	8,173,000	8,295,000	7,327,000	4,614,000
Belgium	2,655,000	2,764,000	3,073,000	3,300,000	4,065,000	3,872,000	3,645,000	3,320,000	2,508,000	2,428,000
Luxemburg	1,805,000	1,925,000	2,002,000	2,234,000	2,659,000	2,526,000	2,431,000	2,208,000	2,053,000	.....
Italy	1,760,000	1,369,000	1,430,000	1,746,000	2,109,000	1,932,000	1,570,000	1,752,000	1,757,000	919,000
Spain	450,000	480,000	594,000	910,000	985,000	770,000	653,000	598,000	616,000	238,000
Sweden	580,000	517,000	530,000	601,000	683,000	567,000	491,000	487,000	467,000	582,000
Germany	7,430,000	5,678,000	8,136,000	11,354,000	15,986,000	14,285,000	16,050,000	12,145,000	12,000,000	18,632,000
Austria	220,000	201,000	317,000	461,000	622,000	626,000	551,000	473,000	462,000	2,585,000
Czechia	750,000	661,000	1,490,000	1,721,000	2,103,000	1,704,000	1,662,000	1,316,000	1,476,000	.....
Poland	820,000	541,000	1,020,000	1,217,000	1,355,000	1,226,000	1,226,000	775,000	779,000	.....
Hungary	135,000	177,000	311,000	363,000	505,000	478,000	464,000	320,000	227,000	.....
Russia	6,500,000	5,791,000	5,333,000	5,610,000	4,828,000	4,206,000	4,150,000	3,087,000	2,087,000	4,181,000
Japan	2,200,000	2,322,000	1,834,000	2,288,000	2,249,000	1,840,000	1,658,000	1,475,000	1,279,000	300,000
India	600,000	570,000	625,000	619,000	575,000	410,000	575,000	520,000	449,000	.....
Australia	475,000	450,000	360,000	420,000	460,000	462,000	466,000	338,000	351,000	.....
Saar	1,685,000	1,440,000	1,513,000	1,904,000	2,174,000	2,040,000	1,865,000	1,709,000	1,554,000	.....
Miscelleneous	300,000	300,000	350,000	400,000	400,000	350,000	305,000	175,000	275,000	200,000
WORLD TOTAL	65,281,000	49,836,000	68,119,000	93,057,000	117,980,000	107,477,000	100,876,000	91,898,000	89,202,000	74,687,000

German figures in 1913 are for pre-war territory. Austrian figures in 1913 include the major portion of Czechia and Hungary. Japan's figures include Manchuria and Korea.

Exports and Imports of the Principal Countries

(Gross tons—Scrap eliminated)

Country	EXPORTS 1933	1932	1931	1930	1913	IMPORTS 1933	1932	1931	1930	1913
United States	440,000	367,000	829,000	1,623,000	2,648,000	380,000	369,000	404,000	510,000	273,000
Great Britain	1,900,000	1,889,000	1,979,000	3,160,000	4,969,000	950,000	1,592,000	2,845,000	2,912,000	2,331,000
Germany	1,875,000	2,152,000	3,947,000	4,464,000	6,200,000*	910,000	680,000	830,000	1,122,000	300,000*
France‡	2,705,000	2,410,000	3,574,000	4,056,000	640,000	255,000	240,000	378,000	510,000	185,000
Belgium & Luxemburg	3,210,000	3,311,000	3,663,000	3,867,000	1,550,000†	325,000	294,000	475,000	673,000	874,000†
	10,130,000	10,129,000	13,992,000	17,170,000	16,007,000	2,820,000	3,175,000	4,932,000	5,727,000	3,963,000

*Includes the Saar and Luxemburg. †Belgium only. ‡Includes the Saar, except for 1913.

and 20 per cent for France. In point of tonnage, Germany again was in second place, with 7,430,000 tons, Great Britain third with 6,980,000 tons and France fourth with 6,485,000 tons.

Pushing rapidly to the front, however, is Russia, which in 1933 poured 6,500,000 tons of ingots and castings, slightly topping France, and only trailing Germany and Great Britain by a small margin. In pig iron, Russia actually outstripped all other European nations, its total of 7,000,000 tons being more than half of the total for the entire United States, and comparing with 6,265,000 tons for France, 5,125,000 tons for Germany and 4,100,00 tons for Great Britain.

Among the smaller European nations, Poland made a striking recovery, with an increase of about 50 per cent, to 820,000 tons in steel ingots, making up to a large extent the considerable drop that occurred in 1932. Italy lifted its steel tonnage about 28 per cent, advancing to 1,760,000 tons, while the Saar improved 17 per cent and Czechoslovakia 13.

In 1933, Belgium saw its steel output about 100,000 tons less than in the previous year, and Luxemburg also suffered a further drop of 6.2 per cent. That Belgium and Luxemburg's production did not increase in proportion with that of neighboring countries is due to the reduction of export business and also to the control exerted by the European Steel Entente. The five member-countries of the entente together produced 20,060,000 tons of steel, compared with 17,357,000 tons in 1932.

In the continents outside America and Europe, Japan registered an increase in steel production, and there is also reason to believe that there was a slight increase in India and Australia.

The accompanying table of exports and imports shows how little progress has been made in the exchange of iron and steel products during the past year.

Exports last year of the five major countries totaled 10,130,000 gross tons, only 1000 tons more than in 1932 and comparing with 13,992,000 tons in 1931 and 16,007,000 tons in prewar 1913.

Imports, however, for the fourth consecutive year developed a decline, last year aggregating 2,820,000 tons for the same five nations, against 3,175,000 tons in 1932. The difference between exports and imports in large measure was absorbed by the nonsteel producing nations.

The elimination of scrap, of course, affords a truer gage of actual consuming requirements, inasmuch as scrap eventually reappears in the form of iron and steel. Japan, Italy and Poland last year were large buyers of scrap, especially in the American market.

World Production of Pig Iron

Gross Tons

	1933	1932	1931	1930	1929	1928	1927	1926	1925	1913
United States	13,083,000	8,674,000	18,263,000	31,441,000	42,270,000	37,832,000	36,289,000	39,101,000	36,370,000	30,653,000
Canada	240,000	160,000	466,000	813,000	1,160,000	1,083,000	760,000	795,000	596,000	1,015,000
Great Britain	4,100,000	3,573,000	3,773,000	6,192,000	7,589,000	6,611,000	7,294,000	2,458,000	6,262,000	10,260,000
France	6,265,000	5,448,000	8,068,000	9,874,000	10,198,000	9,821,000	9,125,000	9,281,000	8,358,000	5,126,000
Belgium	2,705,000	2,739,.00	3,180,000	3,311,000	4,030,000	3,843,000	3,692,000	3,345,000	2,501,000	2,445,000
Luxemburg	1,845,000	1,929,000	2,020,000	2,433,000	2,860,000	2,726,000	2,688,000	2,472,000	2,325,000	.....
Italy	550,000	480,000	532,000	569,000	718,000	545,000	487,000	505,000	474,000	420,000
Spain	320,000	283,000	468,000	606,000	740,000	552,000	603,000	479,000	520,000	418,000
Sweden	295,000	280,000	411,000	488,000	516,000	431,000	448,000	493,000	455,000	730,000
Germany	5,125,000	3,871,000	5,964,000	9,540,000	13,187,000	11,615,000	12,893,000	9,490,000	10,014,000	19,000,000
Austria	90,000	93,000	143,000	282,000	455,000	451,000	428,000	328,000	374,000	2,344,000
Czechia	500,000	443,000	1,146,000	1,414,000	1,618,000	1,544,000	1,241,000	1,071,000	1,147,000	.....
Poland	310,000	195,000	341,000	470,000	693,000	673,000	607,000	322,000	310,000	.....
Hungary	65,000	65,000	157,000	253,000	362,000	281,000	294,000	185,000	92,000	.....
Russia	7,000,000	6,107,000	4,782,000	4,920,000	4,253,000	3,322,000	3,290,000	2,395,000	1,521,000	4,563,000
Japan	1,900,000	1,517,000	1,385,000	1,635,000	1,491,000	1,520,000	1,263,000	1,160,000	917,000	236,000
India	925,000	910,000	1,072,000	1,180,000	1,348,000	1,055,000	1,145,000	902,000	888,000	204,000
Australia	425,000	400,000	380,000	308,000	420,000	410,000	550,000	442,000	439,000	47,000
Saar	1,590,000	1,327,000	1,491,000	1,881,000	2,071,000	1,905,000	1,743,000	1,599,000	1,427,000	.....
Miscellaneous	750,000	750,000	800,000	750,000	750,000	850,000	750,000	750,000	680,000	339,000
WORLD TOTAL	48,083,000	39,244,000	54,842,000	78,360,000	96,729,000	87,070,000	85,590,000	77,573,000	75,670,000	77,714,000

German figures in 1913 are for pre-war territory. Austrian figures in 1913 include the major portion of Czechia and Hungary. Japan's figures include Manchuria and Korea.

ENGINEERING EFFORTS OF 1933 AIM AT LOWER PRODUCTION COSTS

BY E. F. ROSS
Associate Editor, STEEL

ALTHOUGH 1933 enjoyed a measurable degree of business recovery, technical developments in the steel and metalworking industries continued to suffer from restrictions imposed by three years of depression. Manufacturers were forced to arrive at lower production costs, but finding themselves in no position to finance purchases of major equipment, were obliged to attain economy by modernizing existing facilities and devising improved methods. So well was the task accomplished that industry is well prepared for the anticipated upturn in 1934.

Blast furnace practice demonstrated best opportunities for reduction in costs to be in beneficiation and conservation of materials. Further test showed slow blowing to be practical. Insulation of open-hearth furnaces and a closer control of iron oxide answered the demand for lower-cost steel.

In the rolling industry, interest was concentrated largely in the development of mechanically-equipped cold mills for strip and tin plate. One new mill was constructed with forged and welded plate housings. Further use of extrusion forging, chromium plating of die surfaces and more general application of die typing constituted progress in the forging industry. Outstanding developments in welding were precision control in the resistance process; improvement in methods for welding stainless and aluminum; and more general acceptance of welded structures. A code for welded piping was issued.

Progress in heat treatment consisted of expanding application of controlled furnace atmospheres for bright annealing, surface hardening and prevention of scaling; induction heating of solids; heat treating of cast iron; and a better understanding of quenching. The depression is credited with bringing about the true meaning of obsolescence as applied to machine tools. New equipment reduced idle time.

Foundrymen devoted much time to research and development of alloy castings to meet requirements of high-temperature and corrosive service. Manufacturing operations were studied carefully to minimize costs. Die casting alloys were improved and casting machines made considerably more productive.

The year saw the majority of refractory manufacturers promoting various types of semirefractory insulating brick which effected substantial fuel savings and more uniform operating temperatures. The practice of applying hot galvanizing was improved through wider use of liquid fluxes and the perfection of better coating technique.

ON the succeeding pages STEEL presents its seventh annual composite review of engineering progress in the steel and associated industries. To the more than 95 leading engineers, metallurgists and operating officials in the country whose generously contributed opinions have made possible this resume of technical development in 1933, STEEL gratefully expresses appreciation and acknowledges indebtedness.—The Editors.

Improved Auxiliaries Effect Blast Furnace Economy

NINETEEN hundred thirty-three for the most part was devoid of the development of new designs and equipment for blast furnace service. Continuation of a subnormal demand for iron and steel products discouraged expenditure of funds for new devices and greatly retarded the general adoption of improvements that already had been proved sound.

Conservation and more profitable use of blast furnace gas continues to be the most active line of advancement, observes W. A. Haven, vice president, Arthur G. McKee & Co., Cleveland. The trend is definitely toward final cleaning of blast furnace gas so that it can be used in the more efficient small-checkered stoves, for coke oven heating and in the mill furnaces. Effort to perfect gas cleaning and reduce its costs continues, particularly with the wet electric precipitation method. Two precipitator installations were made during the year, one of them of new design.

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THE problem of designing a perfect valve for both hot and cold gas mains, which has defied solution for so many years, is still being worked upon, states Mr. Haven. The first installations of a new type of double disk valve recently have been made, in which the necessity for spreading the main is eliminated by placing the valve disk permanently inside the main, thus avoiding the inherent defects of the goggle-type valve. Heat resisting materials are used and the disk is forced tightly against the seat by mechanical means independent of the closing mechanism. The valve is adapted to either hand or mechanical operation and to remote control. It is probably faster in operation than any valve that yet has been placed on the market.

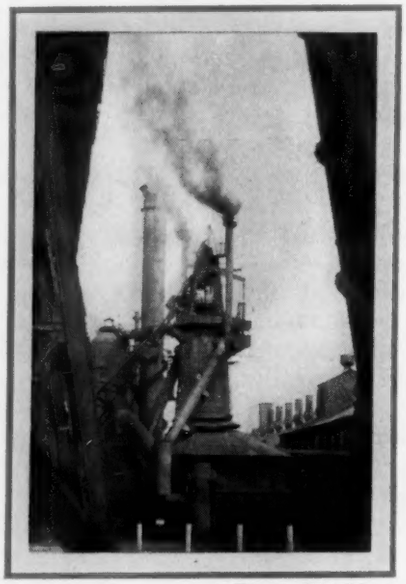
Mud guns are still commanding attention from designers and two new types of electrically-driven piston guns are to be noted. The Hopkins gun, the original electric unit which utilizes the screw feed, with continuous discharge of clay, has been considerably improved.

No noteworthy change is to be noted in the size of furnaces or in furnace lines. The successful application of slow blowing to large furnaces during the depression period has demonstrated further the merit of units of higher capacities and indicates that the trend will continue toward fewer and larger stacks.

In material handling there is likewise little to report. A slag pot of new design has been put on the market, which seeks to avoid warping and cracking by corrugating the side walls. Hot metal ladles almost entirely of rolled steel and fabricated by welding are featured by another equipment maker. Also some radical changes in design may be expected when the next occasion for building pig machines arises.

Await Normal Operations

In general, there seems to be a better appreciation of the fact that opportunities for reducing costs are greatest in the beneficiation and conservation of materials. In these respects the development of equipment and methods is considerably ahead of their application, so that a large amount of plant improvement work should follow closely upon the attainment of a normal rate of production. This seems the more likely, Mr. Haven concludes, since expansion of capacity by plant additions appears to be halted, at least temporarily, by the new steel code.



—Eugene Hutchinson

While developments in blast furnace practice were crimped last year largely because of the exigencies of business conditions, yet changes were made in the design of many items of equipment. Among the new auxiliary devices was a unit for automatically measuring the volume of coke charged into skips, which frees the skip operator for other duties inasmuch as his services are not required for this particular operation.

A new use for steel is incorporated in a recently designed steel bottom for hot blast stoves, the first of which was installed last year at an Ohio stack. Standard heavy rolled sections, proportioned to provide uniform expansion throughout each member, are employed in the construction. Heavy angles welded on top of the columns act as guides in which the girders rest and ride, free to expand lengthwise. Short length girders are installed to minimize the effects of expansion and possible warping. Resting free on these girders are short heavy bars welded together into grids. The bars in each grid section and on which the checkers rest are spaced the proper distance apart to allow for the expansion of the brick. The new type steel bottom obviates undue loads or strains on the base, provides free access to the flues, and is adjustable to care for any variation in the checkers.

Efficiency of hot blast stoves was increased 40 per cent or more by the application of refractory inserts which are designed to maintain velocities throughout the checker chamber and cause turbulence and intimate contact between the gases and exposed surfaces of the brickwork. On a bank of stoves where inserts of this type increased the heating surface from 88,000 to 132,000 square feet per stove, the average monthly stack temperature was reduced from 760 to 235 degrees Fahr. and the average temperature of the hot blast increased 210 degrees Fahr.

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BLAST furnace filling equipment developed in this country for foreign stacks and based on demand for larger output from a single stack also is applicable to American practice. The equipment is for use on furnaces where output of 600 to 800 tons per day is to be increased to between 1200 and 1500 tons.

The charging system includes a control interlocked with the skip hoist and bell hoist controllers which relieves the scale car operator from the duty of loading the tub with coke. The device, automatic in operation, insures the opening of the coke hopper gate only when the skip is at rest in the pit beneath; and supplies coke to the furnace hopper when needed in the filling cycle.

Raw materials moved to the top of the furnace were increased in volume by speeding up the skip cars. Since the loads on the bells and their speed of operation were greater than could be handled by the conventional crank-type bell hoist, a larger and different type unit was built. The new hoist is a single machine and operates both the large and small bells; the advantage of the crank-type hoist in seating the bell is retained.

Steelmakers Apply Insulation To Minimize Melting Costs

DURING the past several years of curtailed ingot production, open-hearth plants usually have operated without even parallel replacement, with the result that the spurt of the past summer found many plants in bad physical shape, necessitating rapid and often unsatisfactory and costly renewals of those components that deteriorated through process temperatures. Since summer, normal replacements have been made in more orderly and careful manner, with the result that most open-hearth shops will start 1934 with equipment in good physical condition for the anticipated production rise.

Control of iron oxide by methods suggested by Dr. Herty has commanded wide attention among steelmakers in this country. Other developments, which have met with favor among open-hearth superintendents, include the full sloping backwall, multiple pass checkers, insulation of furnaces above the charging floor and a new semirefractory insulating brick.

Most open-hearth operating executives of older plants, comments W. C. Buell Jr., engineer, Cleveland, now are convinced that there will be little or no capital money available, at least for a long period, for needed modernization of their plants. Therefore, many operators are attempting the modernization of existing equipment by long term betterment programs through the judicious use of their rebuilding funds.

Some research in process and apparatus is being carried on quietly by some producers. Demand for low-cost steel has caused the open-hearth superintendent to scan closely the items comprising his cost above materials, and in a number of cases marked reductions have been made in some of the items that long have been considered "fixed." Among experiments is one in which an improved roof-fired open hearth is being tried out at a plant located in the Ohio river district.

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UNQUESTIONABLY, the most worthwhile piece of work accomplished in steelmaking practice has been that of Dr. C. H. Herty in his solution of the problem of iron oxide control in the basic open-hearth furnace, according to W. J. Reagan, assistant open-hearth superintendent, Edgewater Steel Co., Oakmont, Pa. While it is difficult to visualize just what savings this work makes possible, yet many thousands of dollars will be saved in the control of bath oxidation by increasing yields and substantial savings in ferromanganese, silicon and other final additions. An approximate reduction of 2 per cent iron oxide means an increase in the yield of 1 per cent and a material saving in dollars and cents.

Another outstanding development in steelmaking equipment, states Mr. Reagan, is the new thermocouple developed by Dr. F. G. Fitterer (not yet on the market) which will enable the open-hearth operator to determine the bath temperature before tapping.

Production Costs Satisfactory

Throughout the past year, comments J. J. Seaver, vice president in charge of sales, H. A. Brassert & Co., Chicago, the cost of production of steel at a retarded rate on both large and small size furnaces has been demonstrated fairly well. The full sloping backwall seems to have been adopted universally throughout this country, and in some instances abroad. It has been found advisable to raise the rear skewback channel to the same level as the front skewback, thereby increasing the life of the rear skewback and the roof, Mr. Seaver points out.

Rigid binding, first used on open-hearth furnaces of the tilting type, now has been adapted to the stationary open hearth, thus eliminating the unsatisfactory method of tightening and loosening the tie rods when allowing for expansion or contraction in the furnace roof.

Some interesting cost figures applicable to the operation the past year of large and small furnaces are cited by Mr. Seaver. In one instance, the cost above materials when operating with 150-ton furnaces has been reduced to a point close to $3 a ton, making an ingot cost of approximately $16.50 per ton. This is in comparison to the operation of furnaces of 100 tons capacity where the cost above was in the neighborhood of $4 and the ingot cost slightly under $18. In many cases conversion costs have been reduced $2 a ton and in one case where operation was accomplished on foreign pig iron, an ingot cost of approximately $13 was obtained.

Throughout the industry, Mr. Seaver states, it now generally is accepted that insulation of open hearths above the charging floor is economical from the standpoint of fuel saving, particularly when considering the longer life of the refractories involved. A number of furnaces thus insulated have given longer life and the problems involved in the roof insulation have been solved completely. Recent installations of full sloping backwall, states Mr. Seaver, have been made where insulation was used between the outer plate and inner brickwork. The use of insulation in this part of the furnace, he contends, not only improves the refractory life in the furnace but makes the working conditions around the backside of the furnace more comfortable.

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ONE of the most valuable lessons learned by plant executives during the trying depression years is that they dare not allow expensive heat units to escape from poorly insulated and loosely constructed open-hearth furnaces, observes L. F. Reinartz, works manager, American Rolling Mill Co., Middletown, O. Many schemes have been tried to reduce radiation and conduction losses from melting furnaces. In the end, although the most expensive, the insulation of walls of checker chambers and slag pockets with well-known insulating compositions and then encasing the walls with welded steel plates will pay the most dividends on an investment, Mr. Reinartz contends.

Additional plants have installed fans for forced draft, as well as to control the amount of air for combustion. Multiple checkers have been tried out in many plants, Mr. Reinartz observes. Furnace controls of various designs still are in an experimental stage. Nevertheless, all of these innovations are helping to increase the general efficiency of combustion, which, in turn, means higher furnace temperatures and increased production. Every advance of this kind, he states, increases the need for better refractories in the melting laboratory of the furnace as well as in the checker chambers.

In conclusion, Mr. Reinartz cau-

(*Please turn to Page* 127)

Three Types of Mills Compete For Flat Rolled Tonnage

DESPITE adverse conditions prevailing in 1933 many pieces of auxiliary equipment were designed and built for the rolling mill industry. Numerous electrical developments assisted in the improvement of quality. Continued interest in sheet and tin mill activity was apparent, the trend being toward the production of these products on cold strip mills and on mills mechanically equipped. Several tandem cold strip mills with rolls and reels driven, as well as single stand 4-high mills with nondriven rolls and driven reels were placed in operation for the first time.

Much of the activity credited to 1933 centered on paints and finishes suitable for sheets of ordinary surface finish, tandem tin mills for handling the product in strip form, continuous gaging of strip in the process of reduction, an instrument for indicating the percentage of reduction, photoelectric pyrometers, 3-high mills and composition bearings.

H. A. Winne, industrial engineering department, General Electric Co., Schenectady, N. Y., directs attention to installation of a 5-stand tandem mill with a tension reel for rolling tin plate. This, he states, appears to be a radical shift from the tendency to decrease the number of stands in tandem which has been apparent for the past two years. Several cold strip mills, he remarks, were equipped with continuous gages for indicating the thickness of strip leaving the rolls. On one of the reversing mills the continuous gage is equipped with contacts for controlling the screwdown to maintain automatically the thickness of the metal leaving the mill within the tolerances for which the contacts are adjusted.

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ANOTHER recent contribution to production of more uniform strip is an instrument to give continuous indication of percentage reduction in a reversing strip mill, states Mr. Winne. Additional applications of the photoelectric pyrometer have been made, this instrument giving quicker indication and record than any other type of pyrometer for temperatures above 1400 degrees Fahr. Indication and record can be obtained in less than a second.

In commenting on the important advances made last year in sheet and tin mill practice and equipment, R. J. Wean, president, Wean Engineering Co. Inc., Warren, O., point out that developments formerly were directed toward lower cost and selling prices with the resulting elimination of labor. During 1933, however, there was a definite condition set up in the form of government regulation which has and will continue to force steel companies to study their cost problem, having in mind the aiding of labor in the greater production with less effort. Equipment will be sold on the strength of its ability to "aid" rather than to "eliminate" labor, he contends.

An important trend favorable to the modernized sheet mill is the development of paints and finishes whereby the surface of the product is relatively unimportant and extremely high glossy finishes are not desired. The only important requirement is that the drawing quality of the material be satisfactory. This year, Mr. Wean points out, probably will witness a tremendous development in the treatment of the surfaces of steel and other metals for the application of paint, enamel and other coatings. New products and new outlets for flat-rolled materials were developed and much progress made during last year and, concludes Mr. Wean, the importance of these will be realized more fully during 1934.

Quality and Finish Improved

Unusual progress has been made in the rolling of hot strip and sheets, comments W. H. Burr, superintendent electrical and mechanical departments, Lukens Steel Co., Coatesville, Pa. Continuous hot-plate strip mills rolling material 76 inches wide have been installed and modern sheet mills with catcher tables have resulted in the production of strip and sheets far superior in quality and finish to that produced by older methods. Modern coilers and flying shears played a most important part in this development.

In the future, he contends, considerable developments in the methods of cold rolling of metals can be expected. Production of alloy steels suitable for certain specific applications is adding much to the already complex process of steelmaking. The increase in the use of composition bearings on all types of rolling mills, Mr. Burr points out, has been marked during the past year and resulted in a reduction in bearing and lubricating costs.

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THREE-HIGH mills, which for many years served as the finishing stand for jobbing units, again are coming to the front, according to the observations of F. L. Estep, vice president, Perin Engineering Co. Inc., New York. The latest development for roughing bars on this type mill is to have the top roll positively driven through pinions, the top and middle rolls counterbalanced, and the middle roll actuated by the tilting of the back table.

Claim is made, states Mr. Estep, that bars to shear approximately 60 net tons of sheets can be rolled in 8 hours but as a matter of belief, he continues, this may be increased by a close study of table and mill operations and slight changes in tables and controls to save every fraction of a second possible in the operating cycle. A time, pair to pair, of 20 seconds has been reached over short periods, but it is possible to reduce this to an average of perhaps 16 seconds over an 8-hour shift. Steps are being taken in the design of 3-high mills, Mr. Estep states, to permit changing the middle rolls with the mill running and thus avoid the shutdown otherwise necessary for this operation.

Miscellaneous auxiliary equipment developed last year was accorded favorable reception. One of the contributions includes an automatic preset screwdown control which affords uniformity of product, increased production, ability to roll various sizes of ingots, and increased efficiency of operators.

A self-contained electrical device, for use in connection with hot neck lubrication for lubricating sheet, tin and cold mill roll necks was brought out during the year.

Attention during the year was directed intensively to the possibilities of wrought steel for roll housings. A cold rolling mill installed in the Chicago district used this type construction, laminated forged steel links being electrically welded together.

Desirable features associated with two types of machines employed for eliminating stretcher strains in sheets were combined into a single unit. The

unit permits flexing of the sheet to be carried further beyond the elastic limit of the steel than heretofore has been possible by a roller leveling machine, thus affording greater freedom from stretcher strains.

Improvement in quality of work produced and reduction in the cost of cleaning, as compared with pickling, were effected by a new machine for the abrasive cleaning of billets and other metal products. The unit will handle more than 200 tons of 4 x 2-inch billets in a 10-hour period.

Wire baker economy was secured by an oven which rests directly on the mill floor and requires no excavation. Space occupied by the combustion chambers is insulated from the baking compartment; transfer of heat is by recirculating convection heat. The drying time is so accelerated by the rapid movement of air through the work that a relatively small oven turns out large production.

Direct firing of wire baking ovens was another contribution of the year. Carbon monoxide in the atmosphere is controlled automatically. A slight pressure within the oven assures uniform baking temperature in all corners of the oven. Baking temperature is maintained within a tolerance of 5 degrees Fahr. by thermostats.

Stress of Times Centers Progress in Forging Industry in Die Design

IMPORTANT technical developments in the forging industry during 1933 were lacking, despite the fact that a progressive refinement of detail, further adaptation of the extrusion method of forging, chromium plating of die surfaces to prolong life, and more rapid strides in the art of die typing have contributed toward revitalizing forging technique as industrial recovery proceeds.

Unfortunately in some plants the drop forging department is in the position of being tolerated as a necessary evil, possibly, as suggested by MacDonald S. Reed, sales engineer, Erie Foundry Co., Erie, Pa., because few production and design executives have come up through the drop forge shop and are familiar with its problems and its possibilities. As a result, the forging department has become a sort of plant step-child.

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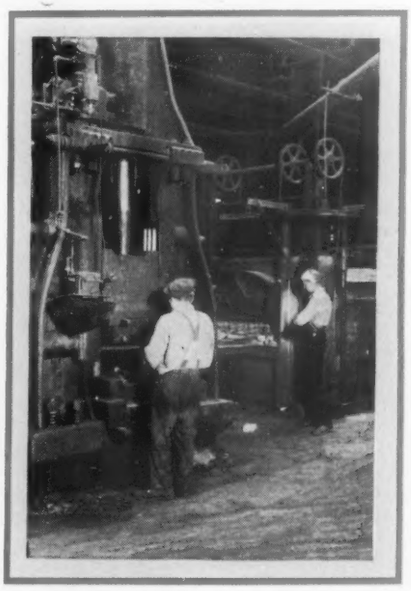
UNWILLINGNESS or inability to modernize forging equipment has compelled some manufacturers, among them automobile plants, to close down departmental forge shops and buy their forgings from commercial forgings producers, Mr. Reed points out. Equipment thus obsoleted is thrown on the used machinery market, scrapped or passed along to commercial shops as an offset account against an order for forgings.

Citing another example of the use of obsolete forging equipment, Mr. Reed tells of a large corporation which operates a drop forge shop in which forgings are made on crank-operated hammers which lift the ram by means of a strap. One of these hammers has been operated for almost 40 years and was second-hand when installed!

The trend toward independent wheel suspension in automotive design is being watched with interest by forging interests. Although the new system eliminates drop-forged front axles, other forgings of a comparable size will be required and in some designs a number of other smaller forgings are required.

Die Life Is Increased

That progress in 1933 has been concentrated in die departments is the opinion of L. E. Ruby, works manager, Pittsburgh Forgings Co., Jackson, Mich. Chrome-plated die impressions have proved satisfactory, giving from 20 to 50 per cent greater die life in a majority of cases. Even greater strides toward increased die life have been made by typing of forging dies, a development of some two years ago and first used on a large scale by the Ford Motor Co. It involves the hot forming of die inserts from a master die in a drop hammer or heavy press. Mr. Ruby predicts that this year will see typed die inserts in practically universal use.



Many difficult forgings requiring multiple operations in regular practice can be made in one operation by the extruding process, concerning which Mr. Ruby declares that experimental work in the past year has shown great possibilities for practical adaptation. Although die cost in extruding is slightly higher, savings are made in material labor and machine burden.

An interesting combination of forging and stamping is the automobile rear axle housing developed by the Clark Equipment Co., Buchanan, Mich., and described by George Spatta, engineer for that company. This axle is made from a single piece of sheet steel on which both forging and stamping operations are performed, both methods being used to achieve quality and economy over other processes.

An unusual opinion is expressed by Mr. Spatta when he declares that "it is fortunate for the stamping and forging industries that not too much of their technique has been set down in handbooks to form a tradition and clutter up the minds of the men who direct operations in these industries, so that, in the absence of much data and formulas, the minds of these men are left free to search for further improvements and thus contribute each year in greater measure to the sum total of achievement in the mechanical arts."

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IN THE field of heating furnaces for forging, K. E. Rogers, sales manager, Globar Corp., Niagara Falls, N. Y., detects a trend toward the use of electric furnaces, citing the case of one forging manufacturer, forging about 2000 tons of steel a day, who was faced with the problem of rising costs of oil under the NRA oil code, and who is now considering electric heat.

Electric power costs in some districts have been considered excessive, principally because of demand charges and other extras, Mr. Rogers states. However, there is a growing tendency toward the elimination or reduction of such extras, with the result that electric heat becomes a more serious contender in the industrial heating field.

Mr. Rogers is of the opinion that controlled atmosphere in a forging furnace, while not new, is something only beginning to come into prominence. Furthermore, refractory developments are permitting construction of forging furnaces with thinner walls, thus providing economical advantages of cutting radiation losses and facilitating more rapid heating.

Welding Processes Receive Much Wider Acceptance

SPURRED by intensive research and education, welding as a method for fabricating metal products and structures received wider application in 1933. Developments considered outstanding were improvement in weld quality, accurate control in resistance welding, more satisfactory procedure in welding stainless steel and aluminum alloys, further perfection of flame machining, broader use of welding in ship and railway car building, adoption of new codes, and more extensive use of X-ray inspection. Progress also was achieved in the long-employed process of riveting with new standards and specifications being set up.

The greatest achievement in welding in 1933 was educating engineers in the value of welding processes. This having been accomplished to a gratifying degree, in the opinion of E. H. Ewertz, Eric H. Ewertz & Sons, New York, welding advocates must make certain that principles are applied properly and joints are designed correctly. Otherwise, results may be disastrous and welding placed under suspicion. Codes already formulated and others under preparation serve not only to guide the manufacturer but to protect the user and the public. Noteworthy is a code now being compiled for qualifying welders dealing with diversified work in jobbing shops.

The chief problem of welding is education in regard to reliability and potential usefulness, advises A. G. Bissell, consulting engineer, Seattle, who states he finds woeful lack of knowledge of welding in general among architects, engineers, contractors and public officials. He believes that research work will do much to alleviate this situation.

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EXCEPT for Class I welding, there is seemingly lack of assurance that a completed job is dependable. How to overcome fear existing in the minds of consumers of welded products is a question raised by J. M. Jardine, Western Welding & Boiler Repair Co., Chicago. To protect welding to the limit of existing knowledge, he suggests that the manufacturer be governed by a given procedure which would diminish possibility of failures. The greatest lack of technical skill is in field work where organized labor is involved—there being no welding union, each trade controls the welders in its own field. Mr. Jardine believes a working agreement might be effected whereby a union operator could work in any of the present organized crafts.

Development and acceptance of a method for rating weld quality definitely is today's greatest need, asserts A. S. Douglass, construction engineer, Detroit Edison Co., Detroit. With prescribed technique, entirely satisfactory welds are producible, but average technique can be much improved.

More extensive application of major welding processes to alloy steels, improvement in technique, and a keener recognition of welding in industrial recovery, are listed as developments of welding in 1933 by J. W. Owens, director, National Weld Testing bureau, Pittsburgh Testing Laboratory, Pittsburgh. When proper codes are incorporated in federal, state, municipal and industrial specifications, welding will expand noticeably because proper protection will be afforded.

Stress Relieving a Problem

Commenting upon technical aspects of welding, R. E. Kinkead, consulting engineer, Cleveland, states that the year closed with an engineering dilemma. A considerable section of the industry believes welds are not safe unless stress relieved in a furnace—yet ships, bridges and buildings, which cannot be put in a furnace, are being welded. In connection with these structures, more attention likely will be paid to procedure technique to assure that damaging degrees of residual stress are not set up in welding. Mechanical stress relieving without heat probably will be used more.

Approximately 4,000,000 pounds of electrodes will be used on ships building under the new naval program. According to L. C. Bibber, senior welding engineer, bureau of construction and repair, navy department, Washington, this indicates the tremendous advance of welding in ship construction. An important step is the changing of all material specifications to make the base metal more suitable for welding.

Extension of successful and acceptable welding to large plating areas of decks and shells of ships is a commendable advance which may well permit a broader application of welding in the structural hull portion of floating vessels. Accurate definite knowledge on the part of naval architects, adoption of heavy covered electrodes, solution of erection and warping problems, has made this possible, advises G. H. Moore Jr., Newport News Shipbuilding & Dry Dock Co., Newport News, Va. The real problem of economical use of welding from an overall viewpoint is yet to be solved, but present applications are paying their way. Corrosion and strength problems are being studied to improve welding quality and to avoid weak points.

The controlled system of resistance spot welding for 18-8 stainless steel is introducing this metal in new fields, for example, in railway cars and ships. The combination of desirable properties of stainless steel and the improved method of making connections, effects great saving in weight. Organization by a prominent inspection bureau of a department for qualification of welders also is regarded as significant, by a well-informed observer.

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SO FAR as welding of stainless alloys is concerned, the most outstanding advancement is in the electric resistance process, maintains L. W. Hostettler, manager of alloy sales, Allegheny Steel Co., Brackenridge, Pa. With 18-8 particularly, it is possible to make sound welds in an astonishingly short time element. Another noteworthy advance is in the alternating-current arc method for light gages of sheet and strip, where electrical resistance welding is impractical. Gages as light as 0.018-inch can be welded by this method and the bead ground down without disclosing pin holes. Rapid strides also have been made in metallic arc welding of stainless alloys.

G. M. Barnes, major of ordnance, war department, Aberdeen proving ground, Aberdeen, Md., believes new processes recently developed for welding stainless steel plates having high physical properties will have far-reaching effects upon design and construction of all types of engineering structures. The great saving in weight possible through use of this construction for mobile machines and stationary structures is not yet fully appreciated.

Although the copper electric hydro-

gen welding process was developed several years ago, its importance has only recently been appreciated fully. T. M. Rude, assistant general manager, Bundy Tubing Co., Detroit, states that facilities of his company's new large zeppelin furnace, available for commercial work during the past year, and demonstration of advantages of the process has opened up an entirely new field.

Within certain limitations, the copper electric hydrogen process has been modified to use less expensive producer gas, a lower temperature "solder" than copper, and a shorter, smaller furnace, points out G. E. Doan, associate professor of physical metallurgy, Lehigh university, Bethlehem, Pa. Professor Doan also mentions that the ductile welds of the shielded arc process are being increasingly accepted for high-duty stresses and that annealing of welded objects for stress relief is becoming routine in many more conservative plants.

Use of the oxyacetylene flame in flame machining and in deseaming billets offers useful advantages, says Prof. Doan, but further developments are necessary before strict appraisals of value can be made. Vacuum tubes and electromechanical devices for timing spot welds accurately are taking guesswork out of this important process. Gamma rays, he states, are rapidly supplanting X-rays for inspection purposes.

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MORE general application of covered welding wires impressed L. S. Moisseiff, consulting engineer, New York. Welding has been applied extensively to the caissons of the San Francisco-Oakland Bay bridge in which hundreds of 15-foot cylinders and domes are required, and is making possible the efficient sinking of these caissons.

Engineers of the Linde Air Products Co., New York, summarize developments in the oxyacetylene welding and cutting field as: Establishing practice for flame milling plate edges in plain carbon steels in preparation for welding, and setting up experimental standards as to profiles and flame milling technique for thickness up to 2 inches; attainment of greater accuracy in machine flame cutting of plain carbon steels; introduction of new cutting machines; wider use of the bronze welding process for rebuilding worn surfaces; improvements in equipment for pipe line welding; and extension of aircraft construction methods to other branches of the transportation industry.

Public recognition has been given for the first time to welded pressure piping through a code issued by the American Standards association, the Linde statement continues. Indicating the widespread demand for welded piping, valve manufacturers have introduced a complete line of fittings designed for welded construction. Use of fusion welding has been approved for the repair of boilers and pressure vessels.

The principal development of welding in the aeronautical industry was perfection of vacuum tube control for automatic timing of spot welds, and application of spot welding to the high-strength aluminum alloys. This field is being studied intensively by several airplane manufacturers, according to J. B. Johnson, chief of material branch, war department, air corps, Wright Field, Dayton, O., and probably considerable spot welding will be used in the future. Seam welding of aluminum alloys also was brought to successful development last year.

Spot welding of stainless steel and

aluminum alloys elicits similar comment from Charles Froesch, sales and service engineer, General Aviation Mfg. Corp., Dundalk, Md., who says much more development remains to be done in seam welding stainless steel. To spot weld thin materials, such as 0.010 to 0.016-inch aluminum alloy sheets, additional elements known as "lentils" of similar materials are inserted between the electrode tips and the sheets, thus the welds resemble rivet heads. Use of lentils on both sides of the sheets prevents weld burning.

Inspection Methods Amplified

Methods for inspecting welds for soundness comprise a most important field in welding. According to code, Class I welds must be X-rayed, but practice now has been developed to the point where this apparatus is being used far more broadly. Commenting upon recent developments in this type of inspection, H. R. Isenburger, president, St. John X-Ray Service Inc., Long Island City, N. Y., points to his company's introduction of the first shock-proof and ray-proof single-tank X-ray unit designed exclusively to meet requirements of industry, and perfection of a new sensitized photographic paper to replace film and provide an economical means for recording radiographic evidence.

The portable X-ray machine was designed for field inspection of welded pipe at Boulder dam; later, examination of welded penstock material was undertaken. According to Mr. Isenburger, a midwestern state contemplates building an electrically welded bridge and inspecting the joints in the field by X-rays. A fact not generally known is that the welded gondolas for stratosphere balloons, both here and abroad, were required to pass X-ray scrutiny.

At present, little is known about strains and stresses in the various layers of weld metal and the adjacent plate stock, or about changes taking place during various stages of heat treatment. This is particularly important in the case of circumferential seams. Mr. Isenburger states that these problems can be studied readily by high-speed high-voltage diffraction analysis.

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IN THE structural steel industry, welding made further inroads on time-tested and universally accepted methods of making connections by riveting. During 1933, the American Institute of Steel Construction, New York, revised its handbook and included new specifications and requirements affecting both riveting and welding. Commenting on these two processes, F. H. Frankland, director of engineering service of the institute, says the year just concluded saw a greater advance in the technique of welding and a lesser one in riveting than for many years, but this was to be expected considering the special circumstances permitting increased research and development work.

Mr. Frankland believes welding is destined to replace riveting to increasing extent in steel construction, but the degree of replacement is dependent upon further developments in technique and education of engineers. He believes it unlikely, however, that welding will altogether replace riveting, at least for many years to come.

Welding, continues Mr. Frankland, was used to an increasing and marked extent in rehabilitating bridges and other structures. Production of ductile welds through use of coated rods overcame previous objections and paved the way for increased welding as against riveting.

Significant developments in riveting in 1933 were a new A.S.T.M. specification for rivet steel calling for improved physical properties and preparation by the American Institute of Bolt, Nut and Rivet Manufacturers of

(*Please turn to Page* 134)

Controlled Atmospheres Find Wider Use in Heat Treating

CONTROLLED atmospheres for bright annealing, gas hardening and other operations, commanded a good share of attention in the heat treating field during the past year. Quenching of steel and its effects were studied further, but much still remains to be done with this problem. Substantial progress was made in nitriding, induction heating, liquid bath heating, heat treating cast iron, in developing better steels and in improving temperature control equipment.

Age hardening, especially in low-carbon sheets; gas carburizing and heat treatment in controlled atmospheres; application of induction heating to heat treatment; cooling rates in quenching; and heat treating and nitriding of cast iron, are listed as fields of important progress in 1933 by F. T. Sisco, editor, *Alloys of Iron Research*, Engineering Foundation, New York. Special methods have been devised for cracking heavy hydrocarbons to provide controlled atmospheres. Induction heating is being utilized for razor blades and chromium-plated tubes.

Probably the greatest unsolved problem in heat treating, a problem of both theoretical and practical importance, is the character and magnitude of stresses due to quenching, concludes Mr. Sisco. Until this is solved, we shall be forced to contend with cracking and failures in heat treated sections.

F. R. Palmer, assistant to the president, Carpenter Steel Co., Reading, Pa., regards work done by his company in investigating the torsion impact properties of hardened carbon tool steel as one of the most interesting and valuable advances in heat treating. A new method of testing and results derived from it appear to have a very direct bearing on heat treating operations. Quenching is regarded by Mr. Palmer as the major problem still to be solved.

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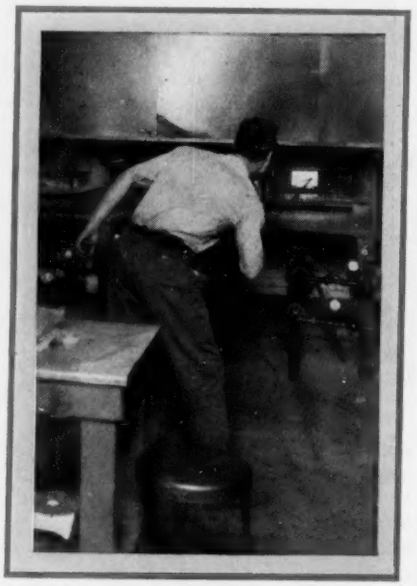
COMMENTING upon the rapid development of controlled atmosphere furnaces during the past year, C. L. Harvey, metallurgist, Lamson & Sessions Co., Kent, O., observes that the present trend in design is toward automatically controlled continuous units of the straight-line type. These units fit into production lines advantageously and require little skilled labor for operation. One field of heat treating which has not been sufficiently developed is that of quenches and quenching equipment. Only too frequently are expensive furnaces equipped with the poorest type of quenching mechanism.

New Light on Inclusions

An important development is the more general recognition of the function of submicroscopic inclusions, particularly those of alumina, in producing steel of high impact strength and of the propriety of adding aluminum to well deoxidized steels. This is particularly significant with regard to heat treatment practice, because low impact steels are more susceptible to failure during hardening than high impact steels. So observes Howard Scott, section engineer, special problems section, metallurgical division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. He also refers to quenching and states that one of the problems of the future is discovery of a liquid which when still has as high a quenching power as agitated water and of a medium having a cooling power between oil and air.



Greater use of the air quench for complicated sections was an outstanding development last year, comments W. H. Phillips, vice president, Molybdenum Corp. of America, Pittsburgh. By proper carbon control and use of a proper combination of alloying elements, air quenching can be used successfully, producing a product equal in strength to liquid quenched material, but virtually free from heavy stress and distortion. It has been found that by studying the point of maximum rate of transformation and air quenching from this temperature, intermediate hardness may be secured, requiring little or no drawback. Such a procedure again further reduces the tendency to residual stress set-up.

Employment of fine-grained nickel-molybdenum steels hardened by direct quenching after carburizing, with no subsequent heat treatment, is regarded as one of the developments of the past year by E. F. Davis, metallurgist, Warner Gear Co., Muncie, Ind. These steels are mostly of electric furnace manufacture and have been adopted to some extent for rear axle and transmission gears. The latest addition is fine-grained chrome-nickel steels of S.A.E. 3115 type—economical substitutes for nickel-molybdenum analysis and nearly equivalent physical properties.

Considerable development in atmosphere hardening furnaces has been made—work processed is free from scale and resembles the cyanided product. Several new energized baths have been put on the market, the outstanding one utilizing a polymerized hydrocyanic acid in a bath of calcium and sodium chloride, concludes Mr. Davis.

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WIDER use of atmospheric control in furnaces is held important by W. E. Jominy, metallurgist, A. O. Smith Corp., Milwaukee, Wis., who states that although the principle is not new, many new applications have been found during the year, including bright annealing and nonscaling heating. This has been aided by greater use of stainless steel. It is now possible to buy standard equipment for these processes.

One or more methods have been developed to prevent pitting of stainless steel sheets in hydrogen atmosphere; likewise, atmospheres are available to prevent decarburization of this material, adds Mr. Jominy. Notable progress also has been made in high temperature alloys during the year.

Increasing attention to control of furnace atmospheres and redesign of furnaces tending toward automatic types impresses H. M. Boylston, professor of metallurgy, Case School of Applied Science, Cleveland, as important progress in 1933. There seems to be a slackening of interest in nitriding with some plants substituting gas and liquid bath methods. As to pyrometic equipment, an instrument has been developed for automatically checking the measuring circuit about every 45 minutes, thus doing away with the necessity of having an instrument man balance the standard cell on potentiometer-type apparatus. Many practical applications have been found for induction heating of solid materials.

Pyrometer manufacturers have brought out new instruments which, although perhaps not more accurate,

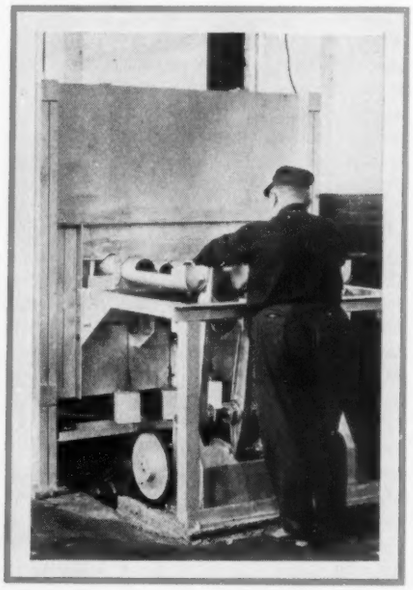
certainly record the correct temperature much more rapidly. Thus comments J. M. Watson, metallurgical engineer, Hupp Motor Car Corp., Detroit, who says that in handling small pieces, a rapid check of temperature is necessary for accurate work. A slight increase is noted in the use of artificial gases, such as butane, for heat treating, and there has been a considerable increase in use of gas as a carburizing material, in preference to solid carburizing compounds. Improvement in heat treating furnaces has been confined principally to controlled carburizing zones.

Refinement in furnace design as better materials and methods become more widely used, is expected by J. C. Kielman, engineer, forge plant, New Departure Mfg. Co., Bristol, Conn. Methods of gas hardening will be improved, for one of the greatest problems in heat treating always has been how to prevent scaling and decarburization at reasonable cost.

Stresses Importance of Nitriding

From the research standpoint, nitriding holds first place, in the opinion of R. L. Dowdell, professor of metallography, University of Minnesota, Minneapolis. General case hardening, especially hardening by gas, seems to follow in second place, while bright annealing takes third place. Excellent temperature control equipment is now available and return of improved economic conditions probably will see it installed much more widely. Low-cost automatic production with high quality always has been the American objective and it will improve automatically with the return to normal.

Control of temperature is susceptible to much greater refinement in respect to uniformity throughout heating chambers of almost all known equipment. G. C. Riegel, chief metallurgist, Caterpillar Tractor Co., Peoria, Ill., believes the refinement will be made in reducing temperature differences throughout furnace charges. Nitriding is being handicapped by the present lack of uniformity of steel quality upon which the process is predicated. The major unsolved problem is that of removing causes which produce occasional objectionable pieces in carefully controlled continuous processes. Nondestructive 100 per cent testing, such as the recently offered electrical methods, has much to recommend its development.



High-Strength Pipe Is Developed

A most interesting development to H. A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland, is a workable process for heat treating thin steel pipe of intermediate carbon content to produce high strengths—unit stresses around 100,000 pounds per square inch—the pipe being enameled inside and outside. Heat treatment is performed after the enamel is applied. The sections are of considerable length and are kept round in the process.

There appears to be considerable current interest in various bright annealing operations on both ferrous and nonferrous metals and effort to make nitridable cast irons is continued. Developments in malleable cast iron, according to Dr. Schwartz, are attempts to make modifications in properties either by changes in heat treatment or changes in composition, which are equivalent to heat treatment in that they alter the graphitizing rate. Some progress seems to have been made in 1933 in introducing car-type fuel-fired furnaces for reducing malleable annealing time by accelerating those steps in the process which are not metallurgically effective.

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DEVELOPMENT of high-tensile strength and alloy cast irons is regarded as noteworthy by H. H. Ashdown, metallurgist, material and process engineering, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Use of specially-refined straight and refined alloy irons has become well established in both as cast and quenched and drawn condition. Among applications are high-pressure castings, camshafts, crankshafts, pressed metal dies and other highly stressed parts. Alloying elements are nickel, chromium, vanadium and molybdenum. Furthermore, nitriding cast iron has been developed.

The general metallurgical field is in the midst of a remarkable alloy development and the next two years will witness many interesting and practical applications of heat treated alloys, especially in the cast iron and nonferrous fields. This is the belief of W. B. Coleman, president, W. B. Coleman & Co., Philadelphia, who finds much effort being devoted to the development and heat treatment of alloy cast irons, nitriding of cast iron, and heat treatment of high copper alloys.

Steelmakers Use Insulation To Minimize Melting Costs

(*Concluded from Page* 121)

tions that increasing costs of raw materials, refractories, and labor will necessitate careful attention being given to the efficient operation of open-hearth furnaces. It will pay the open-hearth operator to appoint an individual to make certain that furnace temperatures are balanced properly in the checker chambers, that furnaces are sealed properly, that valves show minimum leakage, and that furnace controls are used properly.

An important development during the past year has been the insulation of open-hearth furnaces above the charging floor level and especially the roofs, in the opinion of N. A. Humphrey, chief engineer, insulating department, Carey Co., Cleveland. The use of insulation to reduce open-hearth roof losses always has been considered impractical for the reason that it supposedly causes the silica brick roof to soften and burn out more rapidly. But in the face of this foreboding of trouble, part of the endwalls and later the roof of one furnace at the Newburg plant of the American Steel & Wire Co., Cleveland, were insulated. Fuel consumption was reduced materially, production maintained as usual and the furnace roof lasted longer.

Another important development in the insulating field the past year, as pointed out by S. M. Jenkins, Armstrong Cork & Insulation Co., Lancaster, Pa., has been through the constant increasing use of semirefractory insulating brick. This new type brick eliminates the necessity of using firebrick and insulating material combined in heavy furnace walls.

New Design Machine Tools Reduce the Idle Time

IN THE adjustment to meet requirements of higher wages and reduction in working hours, industry is depending upon design innovations of new tools and plant equipment. While success of this policy seems assured and the logic is sound, there is little concrete evidence available at present on which to base results. Industrial management and equipment manufacturers are in a state of flux, with high hopes for definite signs of sound and permanent improvement after the crisis in the "experiment" has been reached.

The depression can be credited with one benefit; it has revealed the true meaning of obsolescence. While production rates were skidding, engineers were striving to devise new and improved machinery which would overcome the faults of antiquated equipment that wasted hours in the setting up of jobs. Thus, as J. M. Walter, assistant chief engineer, G. A. Gray Co., Cincinnati, points out, reduction of idle machine time through greater versatility of equipment is a development worthy of note.

Quoting him further, he explains that when the work is of such nature that it must be routed to several machines in the shop, total set-up time on various units becomes so large as to be entirely out of proportion to actual cutting time. A striking example in this field is a new machine capable of efficient planing, milling, drilling and boring. This is not accomplished by applying or removing attachments, but by having all the necessary units built compactly into the machine, with simple convenient controls. Consequently the changeover from one type of machine to another can be considered as a matter of seconds.

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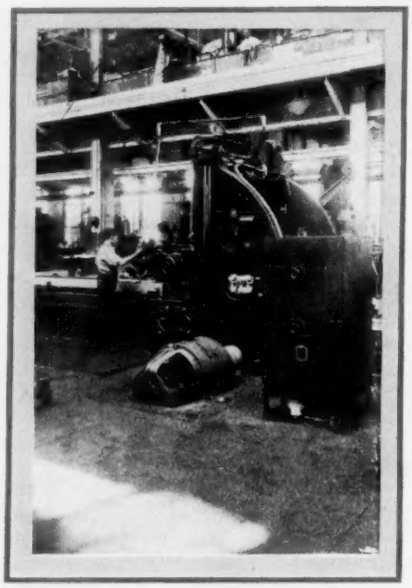
REVERTING to the obsolescence factor, it is interesting to observe the views of Tell Berna, general sales manager of National Acme Co., Cleveland. In the beginning of 1933, says Mr. Berna, our customers were interested in low-cost machines and those only to take care of their immediate requirements. There was a live market for used machines, the least expensive the better.

As the year wore on, he relates, the situation became decidedly better and now customers are making their plans ahead by replacing obsolete equipment in order to secure greater production and lower costs which new machinery makes possible. Mr. Berna believes that if some constructive plan can be worked out to finance purchases of capital goods so that customers can buy the new equipment that they need without too much risk, this important division of industry will improve decidedly during the ensuing year and will have an exceedingly beneficial influence on the unemployment problem.

Cites Possibilities of Alloy

In the opinion of A. B. Bolender, tool supervisor, Warner Gear Co., Muncie, Ind., one of the outstanding achievements is "alloy 548." While this is not thoroughly developed, he asserts, "it certainly looks as thought it holds the possibility of an improvement in cutting steel similar to the improvement that tungsten carbide had on cutting of cast iron." Supplementing his comments on the year's contributions to the metalworking industry, Mr. Bolender refers to the use of rolled steel plate, flame cut and welded, to make frames of machine tools. He points to this as an economical improvement as well as a mechanical improvement.



This observation in regard to the use of torch cut parts is particularly timely and calls attention to the attainments that have been made in torch cutting equipment for producing large shapes. A pantograph type of machine recently was introduced which removes earlier restrictions in regard to size of shapes obtainable. The base as well as the arms travel to permit cuts over extended areas.

Concurrently, another company has announced a portable gas cutting machine which combines the "carry-about" features of a blowpipe with the accuracy and finish of a cutting machine. When operated on a track, the machine does straight-line cutting automatically; for cutting simple shapes it can be guided with a hand grip. A center and radius bar adapt it to automatic circle cutting.

The foregoing examples show only a small cross section of the progress in this field. They call to mind the innovation known as flame machining which stirred the engineering profession earlier in the year. H. H. Moss, engineer, Linde Air Products Co., New York, has been particularly active in the development of flame machining.

The process involves the use of a gas cutting blowpipe which is substituted for the cutting tool and holds possibilities in simplifying the machine tool as it is known today. Planing, turning, grooving, centering, miling, drilling, etc., have been accomplished satisfactorily. The primary distinction between flame cutting and flame machining is the use of a tangential positioning of the cutting stream in the latter process.

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STRENGTH with reduction of weight and cost economy, outstanding attributes of torch cut parts, augur well for their more extensive use. Appearance, as well, foments wider acceptance by design engineers. As W. K. Creson, assistant chief engineer, Ross Gear & Tool Co., Lafayette, Ind., observes, considerable discussion pro and con has prevailed relative to the value of appearance in machine tools. It seems quite plain, he believes that those who are attacking the "economic waste" of money spent on improved appearance are individuals who are under excessive pressure in showing favorable costs. In this STEEL concurs, and is inclined to agree with Mr. Creson that when easier conditions return, machine tool buyers will again insist on appearance in addition to performance.

Observing Mr. Bolender's appraisal, to the effect that there have been many improvements in hydraulic feeds for machine tools, recalls a new unit which was designed and built by Hammond Mfg. Co., Cleveland, for one of the large automobile manufacturers. This machine drills and reams three holes simultaneously in the three bosses of a V-type internal combustion engine block and then inserts an oil distributing tube. Operation is continuous; five cylinder blocks are handled at the various stations of the machine at one time. To provide a simplified

system of variable feeds, drill guides, clamps, etc., all brought into operation at predetermined intervals, the engineers turned to hydraulic devices. Obviously, mechanical mechanisms would have resulted in complicated design; use of hydraulics provided a flexibility of control, a cushioning effect and ease of operation.

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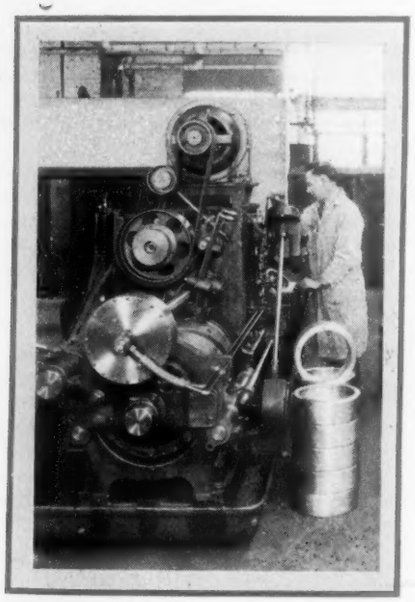
AS REVEALED by the recent progress report of the machine shop practice division of the American Society of Mechanical Engineers, some interesting comments have been set forth by prominent engineers. It brings out that progress in machine shop practice during the last 12 months has been characterized by a great amount of work on speculative designs of equipment, and progressive thought in its application. Instances of tangible progress sustained by evidence of reduced cost and improved quality, are relatively few and far between, this condition being brought about largely by the relatively low activity in machine shops. In the survey made by editors of STEEL this was identically the reaction obtained from contact with the many leaders in industry.

Particularly interesting moreover, is the conclusion reached in the report: Evidence grows that the basic radical changes in thought and procedure to which attention was drawn in last year's report, have come to stay and are meeting the acid test



of commercial usage under highly competitive conditions.

Termed a "New Viewpoint," the report points out that another element which is having a marked effect on the overall efficiencies of machine shop operations is the tendency on the part of a number of large users of mechanical equipment to deviate from the long established practice of regarding each productive unit in the line as more or less an independent, individual problem. The tendency now is to resurvey the operation of the production line as a whole, whenever any question arises affecting redesign of a product calling for reprocessing. That philosophy underlying this change is sound in conception has been demonstrated by reduced costs of production, and the inevitable spreading in the application of this principle.

It will be noted in this review the economic aspect of the times is the singular force behind virtually all improvements. Whether it be welded design, higher speeds, automaticity, improved bearings or appearance, the aim of the design engineer is to meet the new standards of competition set up by the depression. Then came N. R. A., an additional force to reckon with. The machine shop practice report has this to say about it: "Uncertainty regarding the economic effects of the institution of N. R. A. has had an adverse effect during the latter part of the year on the purchase of new machinery. In fact, almost without exception the explanation for delayed action in respect to purchases has been along these lines."

Products Make the Market

Continuing, the report says that in a measure the hesitancy in the face of new conditions is natural. But even in these times the basic principle of sound business still operates; the best way to stimulate and then protect a sound market is to offer a meritorious product at a very reasonable price. The factual basis of this principle is the one thing which has inspired machine tool manufacturers of the country to pursue their technical developments during these last three years of inadequate markets.

Probably the most outstanding development in new machine tools, cited in the report, is the application of external broaching to the shaping of many parts formerly considered as work for the planing machine, the milling machine and the lathe.

The increase in the use of flexible speed control in production machinery is another aspect of the progress that is taking place. Variation in range of sizes, shapes and weight of products processed by machines are some of the factors that enter into the necessity for embodying means for closer control. The trend now is toward built-in transmissions and motors to provide convenience for the operator, conserve space and make the unit more self contained. Synchronization of machines and processes also has become a vital factor in efficient production. Here the variable speed transmission is playing a large part.

One other trend in design that commands particular attention is the increased use of electrical devices such as solenoids, thrustors, thyratron tubes and photoelectric cells. Such devices in combination with mechanical mechanisms have played an impor-

tant role in attainment of compactness in design and simplification as well as more complete control over the operation of machines. One case in point is a recently developed slotting machine. J. M. Enders, General Electric Co., Schenectady, N. Y., advises that electrical equipment for operating this unit consists of a reversing type planer motor for the main drive and nine additional motors for controlling other essential movements. Six motor-driven thrustors also are employed.

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DEVELOPMENT of cemented carbides containing tantalum for the purpose of high-speed cutting of steel appears to be progressing with gratifying results, declares W. W. Finlay, production engineer, Wright Aeronautical Corp., Paterson, N. J. He feels that considerable progress along this line soon will be evidenced in the coming year.

The comment of Carle M. Bigelow, president, Bigelow, Kent, Willard & Co. Inc., Boston, is timely and reflects a keen observation. He sets forth that a careful study of industrial development reveals steady replacement of obsolete equipment to be essential to the maintenance of employment.

Summarizing the year's contributions to design and engineering of plant equipment, the outstanding features reflect an improved technique that offers any well-managed business a clear course to increased profits even in prevailing none-too-active markets.

Age of Alloys Ushers in New Markets for Foundries

STILL laboring under the handicap of a reduced volume of business, foundries nevertheless have pushed ahead with research and new developments, notably in the field of alloy castings. While research budgets have been pared sharply, enough has been accomplished to provide a better understanding of the principles involved in production of strong, tough alloy castings for service under conditions of high temperature or corrosive attack.

Further than the development of improved cast materials has come more efficient foundry management and a more wholesome co-operation among competitors. The latter has resulted largely from establishment of NRA codes for the foundry industry which, according to W. L. Seelbach, secretary and treasurer, Forest City Foundries Co., Cleveland, have shown foundrymen that by getting together and discussing their mutual problems, thereby benefiting their individual operations, these codes will have accomplished something that trade associations have been attempting for many years.

With the industry codified, the leveling of certain competitive advantages resulting from variation in wage and labor conditions brings sharply into focus the need for economy in manufacture, better management, new-type equipment and improved product, particularly in the various jobbing branches of the foundry industry. This observation is made by Dan M. Avey, editor, *The Foundry*, Cleveland, who concludes that the past year has witnessed definite advance in obtaining recognition of new qualities and properties obtainable in castings, rather than any radical innovation in metallurgical practice.

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IN EFFORTS to keep costs at a minimum, every phase of manufacturing methods, quality of material and workmanship has been studied carefully the past year and this has resulted in continued close co-operation between foundryman and foundry equipment builder, in the opinion of H. S. Simpson, president, National Engineering Co., Chicago.

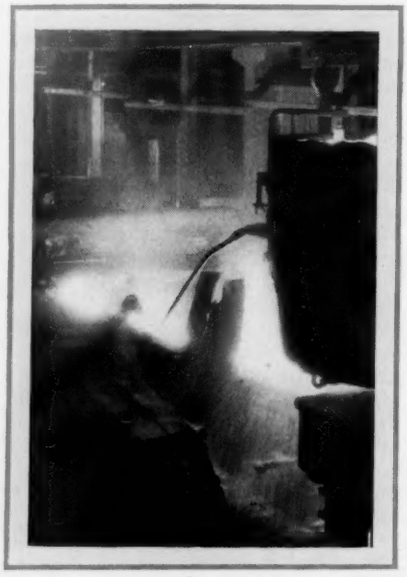
Research undertaken by the Electro Metallurgical Co., New York, in co-operation with the Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., has contributed important information relative to the effect of nitrogen in high-chromium cast steels, the further development of high-chromium cast irons for use at elevated temperatures, and the development of a 16 per cent chromium, 1 per cent nickel steel for aircraft construction. High-chromium irons have been found particularly adapted for such parts as furnace door frames, grate bars, door castings, conveyor parts and stoker links.

Increasing use of cast alloy steels is a trend likewise emphasized by L. S. Peregoy, president, Sivyer Steel Casting Co., Milwaukee, who further declares that, unquestionably, specifications, either chemical or physical, are playing a larger part in the industry's operations than at any time in the past. As evidence of this he cites the tentative adoption of specifications for carbon steel castings and for alloy steel castings by the American Society for Testing Materials.

Nitrogen Refines Grain

Development of machinable 18-8 chrome-nickel steel castings and of 18 per cent chromium castings with a fine grain brought about by the addition of nitrogen in the form of high nitrogen ferrochrome, are cited as particularly interesting advances of the year by John Howe Hall, technical assistant to the president, Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

S. Wells Utley, president and manager, Detroit Steel Casting Co., Detroit, declares that the matter of casting design and its many influences, on both the cost of production and the quality of product, has received lively attention during 1933. He also notes evidences of improved co-operation between customer and supplier on this important question. Mr. Utley concurs with others in the opinion that a distinct enlargement has been effected in the various grades of low-alloy cast steels, for specific purposes.



Additional progress was made during the year in the use of cast materials in automotive construction, a trend noted by H. A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland. The integral hub and brake drum, cast camshaft and cast crankshaft are becoming more firmly established with car builders, with Hudson and Chrysler lines adopting cast camshafts, and Ford cast crankshafts.

Metallurgically, Dr. Schwartz notes further attempts to make modifications in the properties of malleable cast iron either by changes in heat treatment or by changes of composition which are equivalent to changes of heat treatment in that they alter the graphitizing rate. Elements which retard particularly the second stage of graphitization—manganese, chromium and molybdenum—seem to be attracting greater interest than those which stabilize the primary carbides, as does vanadium, for example.

Continuing, Dr. Schwartz states: "Some progress seems to have been made in the introduction of car-type fuel-fired furnaces for the purpose of reducing annealing time by accelerating those steps in the process which are not metallurgically effective. It is also interesting to note that during the year a patent was issued to one of the inventors prominent in the field of reducing annealing cycles, which seems to indicate that his earlier improvements were effective only with those alloys which are quickly annealable anyway."

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DEMAND for more prompt deliveries is seen by Enrique Touceda, consulting engineer, Malleable Iron Research institute, Cleveland, as a factor which has compelled malleable plants to devise means to reduce annealing time; in some instances this has been accomplished by the installation of car-type ovens, in combination with short anneals. Mr. Touceda reports no significant changes in metallurgical practice or apparatus during the year, but the matter of recuperation in air furnace work has come to the fore.

A brighter future for the malleable industry, as a result of the President's signing the malleable iron code Nov. 27, and the subsequent organization of an administrative body, is visioned by J. B. Deisher, plant manager, Columbia

Malleable Castings Corp., Columbia, Pa. Continued refinement of the duplex melting method for continuous molding production units was a significant feature of technical progress during the past year, in Mr. Deisher's opinion.

Improvement of molding facilities and sand control in the plant of the Malleable Iron Fittings Co., Branford, Conn., has made possible the production of steel castings which can hardly be distinguished from malleable castings, according to T. F. Hammer, vice president. This improvement has resulted in the minimizing of allowance made for finishing the steel castings, and in some cases has reduced the weight of the finished castings as much as 15 per cent.

Interesting comment on activity in the gray iron field is made by J. W. Bolton, metallurgist, Lunkenheimer Co., Cincinnati, who states: "Keen competition in a limited market has forced foundrymen to make limited tonnages of high class material. Small melting units, such as electric and powdered coal rotary furnaces, capable of giving 'superheat,' have been more widely used. Yet, it seems probable that there is a greater percentage of air furnace iron produced than ever before. Despite these trends, the cupola, although more difficult to handle on a scientific basis, can produce most of these irons, and with greater tonnages there probably will be a swing back to the older melting unit."

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CO-OPERATION with engineers to adapt their product to special uses impresses A. J. Tuscany, manager, Gray Iron Founders' Society Inc., Cleveland, as one of the most important advances of the past year in the gray iron industry. In addition, the acceptance of the cast camshaft and crankshaft by automobile producers portends a new era for superior gray iron in the dynamic field, Mr. Tuscany contends.

Of considerable importance to producers and users of cast iron was the joint symposium presented in June before the American Foundrymen's association and the American Society for Testing Materials in Chicago. As pointed out by James T. MacKenzie, metallurgist, American Cast Iron Pipe Co., Birmingham, Ala., the publication of papers heard at this meeting constitutes a valuable contribution to foundry literature, and worthy of real study.

R. S. MacPherran, chemist and metallurgist, Allis-Chalmers Mfg. Co., Milwaukee, sees as significant trends in 1933 the increasing care given to control of quality of castings and a greater tendency toward specialization in alloy irons.

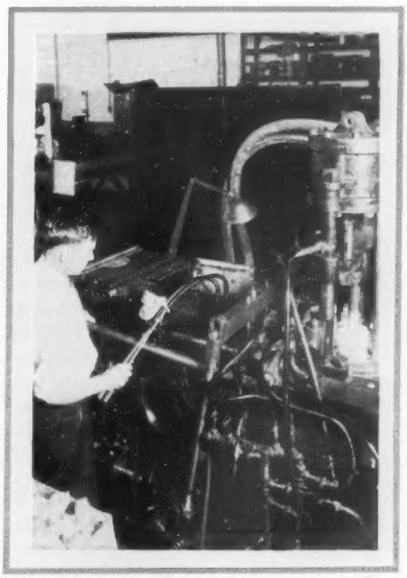
Aside from efforts to improve the product, foundries have made progress in safeguarding the work and health of their employes. In this respect, a major problem has been elimination of dust hazards. Here again, a symposium on the subject of good housekeeping in the foundry, arranged by the American Foundrymen's association, has provided much valuable information in combating this problem. In this connection, F. A. Ebeling, sales manager, W. W. Sly Mfg. Co., Cleveland, points out that the most important factor toward elimination of the dust hazard is prevention of the creation of dust, or confinement of dust in such operations where its creation cannot be avoided. He also suggests that dust preventive measures, while involving additional cost, over a period of time will prove to be an asset rather than a liability, from the standpoint of making the foundry a safe place for workers.

Die Casting Alloys Are Refined; Machines Made More Productive

NOTABLE progress was recorded by the die castings industry during 1933. Outstanding was higher purity of zinc-base alloys and casting of more intricate shapes and thinner sections, more extensive casting of brass and magnesium, more rapid rate of production, a new type of pressure casting machine, and an improved die steel for aluminum casting.

At midyear, all available facilities were operating at full capacity, forecasting inadequate capacity under normal conditions, according to Charles Pack, Pack-Morin Inc., New York. Die casting of brass has gained in volume slowly but steadily, new installations were made and output was larger than in any previous year. Magnesium-base alloys gained momentum and steps toward standardization of these alloys were initiated.

The field of application for die castings increased greatly, continues Mr. Pack. Sizes are much larger—some castings are over 4 feet long and modern practice recognizes no weight limit. The field will be broadened still further by development of high-speed machines for small parts. Small, accurate castings have been made at a rate of 1000 shots per hour for some years, but 1933 witnessed for the first time a die casting machine producing over 6000 individual castings per hour.



Slack operations in 1933 proved beneficial, permitting a revamping of die casting equipment and a clean up of several years of hasty progress, observes W. J. During, chief engineer, Precision Castings Co. Inc., Syracuse, N. Y. An important step was elimination of contaminating constituents in alloys, especially in the zinc series where rigid reprocessing of the metal resulted in reducing and almost eliminating lead, tin and cadmium, and their destructive influences. This development alone promises much in casting life, dependability and uniformity of product.

A general expansion of equipment as to size and capacity has placed the industry in a position to handle larger and more intricate castings, particularly those having greater areas of thin walls, says Mr. During. Technically, many thousands of tests on a new series of alloys promise to fill the gap heretofore existing in a number of applications and these tests will permit more affirmative assertions as to service.

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RECENT outstanding developments have been along three lines—new zinc-base alloys, a new type of casting machine, and a new die steel for use in producing aluminum castings, observes Sam Tour, vice president, and F. J. Tobias, Lucius Pitkin Inc., New York. Introduction by the New Jersey Zinc Co., of new zinc-base alloys with superior physical properties, high impact strengths and negligible dimensional changes, opens new fields. Many assembled products containing parts made entirely of die castings appeared on the market and sold well. Better physical properties

(*Please turn to Page* 133)

Insulating Refractories Gain More General Application

REFRACTORY technologists are practically unanimous in the opinion that the most significant feature of the past year in their field has been increasing popularity and more widespread adoption of semirefractory insulating brick in various types of melting furnaces. Use of this brick results in a thinner wall with consequent lower heat storage and increased furnace flexibility. More and more refractory manufacturers are introducing this type of brick and promoting its use.

Citing some of the advantages accruing from use of insulating refractories, S. M. Jenkins, assistant sales manager in charge of high temperature insulation, Armstrong Cork & Insulation Co., Lancaster, Pa., points out that these brick, originally adapted for use in electric furnaces because of their low heat loss and high efficiency, are now being used in gas and oil-fired furnaces, with some changes in burner equipment. Results have shown fuel saving and more uniform operating temperature.

Mr. Jenkins observes that time alone will tell the life of these materials, but savings already sighted more than justify their use. Furthermore, certain types of furnace operations may be too severe for semirefractory insulation brick, such as in furnaces where a high abrasive or slagging action is present. In these cases, a facing of plastic high-temperature cement ramming mix or firebrick material is needed.

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TREND toward increasing use of insulation in furnaces has followed two lines, according to F. A. Harvey, director of research, Harbison-Walker Refractories Co., Pittsburgh; first, an extension of the use of established brands of insulating products to new types of furnaces—open-hearth roofs, for example; and second, the development of new products which are able to resist higher temperatures than the older forms of insulation, and their use on the inside of furnace walls.

Mr. Harvey mentions as a development of 1933 the production of both magnesite and chrome brick which will not shear under normal loads at temperatures as high as 2700-2900 degrees Fahr. A suitable bonding mortar which will not soften at these temperatures also has been perfected. Another bonding material, with high alumina base, has been introduced. It is shipped wet, ready for use and has a strong cold set and a fusion point equal to first-quality firebrick. Still another bonding mortar announced last year is a clayless silica bonding material, with silica content over 96 per cent and sufficiently plastic for laying up silica brick with either dipped or troweled joints. It is claimed to be suitable for all installations in the steel industry where an acid bonding mortar of higher than normal refractoriness is desired.

Super-refractory insulating brick and high-temperature insulating brick are seen as the ideal combination for use in open-hearth furnace roofs by N. A. Humphrey, chief engineer, Carey

Co., Cleveland, who contends that the adoption of insulation for open-hearth furnaces is one of the most important of recent developments in the refractory field.

A considerable amount of laboratory work has been carried out during the past year in the field of light weight porosified refractories, this development being commented upon by J. E. Brinckerhoff, sales manager refractories department, Babcock & Wilcox Co., Pittsburgh, who also mentions another development that has been gaining headway—the use of expanded or exfoliated vermicullite, which is a good heat insulating material and may be used either in the granular form as a filler or, when mixed with clay, in insulating brick or cement.

Discussing refractory insulating brick, of which his company is a leading manufacturer, Mr. Brinckerhoff states that their use in so-called continuous furnaces has been proved economical, partly because most continuous furnaces are actually operated with week-end shutdowns, or, because of insufficient demand for the product, only intermittently, which results in a complete cooling between runs. Where the furnaces must be heated up from cold, a refractory with low heat storage is economical. Savings of 50 to 85 per cent have been effected in fuel required to heat up and time required to heat up furnaces with insulating firebrick lining, he claims.

G. E. Grimshaw, staff manager, industrial insulation section, Johns-Manville, New York, cites cost figures aimed to show the appreciable savings which can be effected by use of refractory insulating brick in a furnace operating at 1800 degrees Fahr. on a continuous schedule with 48-hour shutdowns over week-ends.

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IN THE field of furnace repair material, a process has been devised for the treating of clinkered dolomite refractories with tar. The product, as pointed out by H. P. Eells, president, Basic Dolomite Inc., Cleveland, resists the disintegrating action of air and water; slaking is retarded; small grains tend to coagulate. The tar coating also eliminates dust in handling the material, while the jet-black appearance is a contributing factor to sales appeal.

Use of the power press method of manufacture has improved cupola refractories by increasing the density of the block, thereby providing greater resistance to slag erosion and abrasion. C. E. Bales, vice president in charge of manufacture, Ironton Fire Brick Co., Ironton, O., mentions this development, and also observes that real improvement has been made in the development of tests and specifications for refractories, among the former being the new panel spalling test (STEEL, Nov. 20, p. 40).

Commendable progress in the use of zirconium compounds for refractories is described by W. B. Cooley, president, Cooley Electric Furnace Co., Long Island City, N. Y., who mentions specifically work of the Doherty Research Corp. in this field. The latter organization has produced three distinct refractories embodying zirconium compounds, each for a particular purpose and each showing high mechanical and thermal properties.

F. H. Riddle, director of reaserch, ceramic division, Champion Spark Plug Co., Detroit, calls attention to the development of a high alumina cement which can be mixed with refractory grogs and cast into massive refractory pieces right on the job. This cement is a product of the Atlas Lumnite Cement Co., New York.

Successful use in electric furnace roofs of high-grade fireclay brick, with fusion point of 3182 degrees Fahr., is outlined by Gilbert Soler, research de-

partment, Timken Steel & Tube Co., Canton, O. The life of these brick is said to be equivalent to silica brick but the cost slightly higher. For hot patching in electric furnace roofs, where silica brick would spall due to the sudden heat shock, these fireclay brick have been used to considerable advantage.

Progress made in the rock wool insulation field is touched upon by Orval White, manager building insulation division, General Insulating & Mfg. Co., Alexandria, Ind. He states that his company has developed a new type of insulating block made by a dry process which leaves the fibers in a flexible state. Although the resulting block is firm and rigid, it can be bent to conform to curves of fairly small radius without breaking. Mr. White points out that the block is light in weight, has a conductivity as low as 0.25 B.t.u., and is suitable for temperatures up to 750 degrees Fahr., or as high as 1250 degrees Fahr. when properly supported.

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MAJOR developments in the refractories industry were few during the past year, in the opinion of J. C. Woodson, manager, industrial heating engineering department, Westinghouse Electric & Mfg. Co., Mansfield, O. He stresses the need for greater mechanical strength in the so-called semirefractory insulating brick and for improved refractory cements for these brick.

Introduction of Hearth-Crete, a chrome-base castable refractory developed primarily as a furnace bottom material, was made during 1933 by the Quigley Co. Inc., New York, and certain features of this product are covered in a discussion by A. L. Diederich Jr., of that company. The material is supplied to the user in dry form and is mixed with water to a stiff, plastic consistency before being applied. It is claimed to embody all the advantages of chrome refractory materials—longer life, resistance to slag and abrasion—as well as chemical and mechanical stability.

Die Casting Alloys Are Refined; Units Speeded Up

(*Concluded from Page* 131)

of zinc alloys and use of somewhat higher pressures has made it possible to reduce wall thickness. The thinnest wall at present is 0.0155 inch and a thickness of 0.034 inch is not unusual.

A new type of die casting machine, using pressures from 4000 to 15,000 pounds per square inch, compared with pressures of 150 to 1500 pounds in previous machines, makes it possible to cast at much lower temperatures, comment Mr. Tour and Mr. Tobias. In the case of 60-40 brass, the temperature is as low as 1575 degrees Fahr. Castings made on this machine are termed "pressure castings" to distinguish from the usual type of die casting. Machines of this type are economical for producing castings from many nonferrous metals; to date, they have been used largely for brass.

To meet the unusually severe service in casting aluminum, the Vanadium-Alloys Steel Co., Latrobe, Pa., has developed a new die steel containing approximately 0.30 carbon, 1.00 silicon, 5.00 chromium, 1.00 tungsten and 1.50 per cent molybdenum. This steel makes the casting of aluminum a more economical process and makes possible a further extension of the field, conclude Mr. Tour and Mr. Tobias.

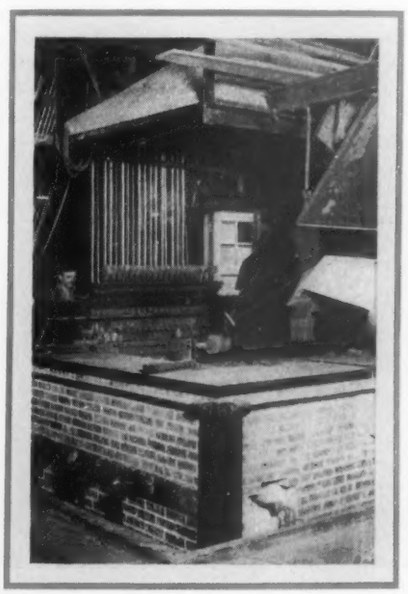
Approximately 25,000 tons of zinc was used in die castings in 1933, as compared with 15,000 tons in 1932 and 20,000 tons in 1931, according to an estimate of R. L. Davis, market development division, New Jersey Zinc Co., New York. Some 36,000 tons was consumed in 1929. The American Society for Testing Materials in 1933 added Alloy XXIII as a tentative specification to Alloy XXI tentatively specified in 1931. The majority of zinc die casting users today are specifying one or the other of these alloys.

With development of these alloys, the refinement of die casting machinery and die design has made rapid progress. The casting of thinner sections has brought zinc die castings into fields where hitherto they were considered too heavy, concludes Mr. Davis.

Better Cleaning Equipment Aids in Application of Surface Coating

INTENSIVE effort to improve all phases of coating practice was expended during the year just closed. The entire field was studied as a single unit in view of the close relationship which exists between cleaning, pickling, fluxing and galvanizing; and, many new ideas were brought to the attention of practical hot-dip galvanizers.

Removal of scale from the surface of flat-rolled steel by high-pressure water sprays is being practiced more widely. Interest in rubber-lined pickling equipment, addition of inhibitors to acid before shipment, wider use of liquid fluxes and coating technique, side firing of galvanizing pots to reduce dross and the utilization of temperature control instruments are included in the important developments of the galvanizing industry for 1933.



A synthetic resin plastic, developed in Germany and introduced in this country, affords a new material for the construction of acid pickling and storage tanks. The product is an acid-resisting synthetic resin bonded with long-fibered asbestos and is not affected by temperature changes.

The extent of scaling, the kind, thickness and other features of scales and iron oxide, formed in rolling, heat treating, etc., are being reduced, according to Wallace G. Imhoff, president, Wallace G. Imhoff Co., Vineland, N. J. Bright annealing has become feasible. In fact, consistent results are obtained with any class of steel heated up to 2525 degrees Fahr. without any decarburization whatever, and not more than 0.0001-inch of scale.

An interesting new development is descaling with spray nozzles. This method is applicable to blooms, bars, strip, tubes, shapes of steel, and other alloys. The pressure is 5 to 10 pounds per lineal inch, and about 6½ gallons of water a minute at 500 pounds pressure is required for a value of 7½ pounds per inch of width. Eliminating all traces of rust, paint, oil and grease in one operation from the surface of iron and steel without harming the base metal is the purpose of a recently introduced liquid solvent.

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ONE of the newest pieces of pickling equipment is the electric immersion heater designed for 115 or 230 volts to heat pickling tanks. The heating element is embedded in refractory material under hydraulic pressure,

baked at red heat and incased in an acid-resisting metal tube.

Continued interest is being manifested in all kinds of rubber lined pickling equipment, states Mr. Imhoff. Rubber lined tanks, valves and fittings, pumps, and all kinds of smaller rubber lined equipment now are available to the pickler to reduce his cost of upkeep and repairs and improve pickling practice. A new type of pure white, acid-proof vitreous lining blocks, a new white acid-proof cement for use with them, and a new and novel method of applying the blocks to the steel tanks, are involved in a new acid-proof steel container.

RECENT progress in development of brick-lined tanks is shown in the application for a patent to simplify construction of pickling tanks. In laying the bricks no spacer is used; a course is laid dry and then the joints poured. Holes are provided for pouring and from these the melted material is led into cavities where it solidifies to form the joint. Another new development in this line is a concrete tank lined with asphalt-impregnated tile which are resistant to sulphuric acid and therefore suitable to pickling tank construction. Many new cements which are acid-proof also have been developed.

Production of inhibitors for the steel industry has developed during the past three years into intensive research and mill testing to the point where it has been proved definitely advisable and far more economical to use inhibitors that are 100 per cent pure without any form of dilutent whatever. Developments have reached the point where 1 pound of material will inhibit a ton of acid.

Another stage in the development of the inhibitor to which Mr. Imhoff directs attention is that it now can be added directly to the acid at the place of production and tank car and carboy shipments can be made so that the acid is inhibited properly when it arrives at the steel plant. A feature is that it gives perfect control of the acid in pickling.

—*H. Armstrong Roberts*

By the use of the newly developed flux with the frothing agent self-contained and by employing the new technique, as pointed out in the July 24, 1933, issue of STEEL by W. H. Spowers Jr., consulting engineer, New York, all dross formed by the introduction of work coated by iron salts is eliminated; the alloy layer structures in the zinc coat, which normally cause fracture, are reduced; and the necessity for shoveling on large quantities of fluxing materials to the top of the kettle is obviated.

The relation of heat application and its relation to pot life and dross production also have been a live subject of the year. It has been shown that under-firing of small pots, and especially shallow ones results in extremely high dross production, and the trend now is toward heat application on the sides, and applying the greatest amount of heat nearest the top, less at the middle, and the least at the bottom. It has been previously shown that the temperature of the galvanizing bath should always be kept under 900 degrees Fahr., and that higher temperatures cause rapid corrosion and destruction of the pot, an excessive dross production, and an overheating of the zinc. Particular attention now is being paid to applying the heat above the dross line. There is also a tendency to turn to instruments for regulating the temperature of the bath.

Welding Processes Receive Much Wider Acceptance

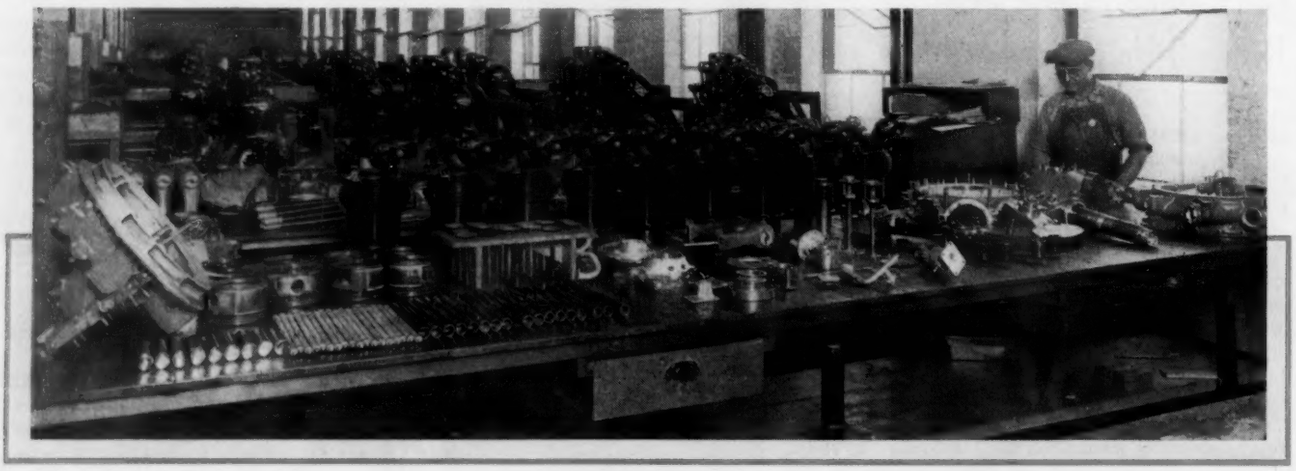
(*Concluded from Page* 125)

a standard specification for rivets for structural steel regarding sizes, weights and dimensions.

Further work on rivets made from cromansil steel developed by the Electro Metallurgical Co., New York, has shown these rivets to possess definite advantages. (See Oct. 2 issue of STEEL). These rivets are less brittle than the usual high-strength rivets, are ductile enough to be chipped and caulked when cold, have high shear strength and can be driven without observing any particular precautions.

Rivets of 18-8 stainless steel are finding a new use in the shipbuilding industry in hull construction. Technique in the manufacture, heating and driving of these rivets was described in the March 20 issue of STEEL. Manufacturers have also recommended practice for chrome-iron stainless steel rivets. During the year, the Aluminum Co. of America, Pittsburgh, contributed much to riveting knowledge in publishing results of research on riveting aluminum and its alloys.

In commenting upon the importance of this work, A. F. Jensen, president, Hanna Engineering Co., Chicago, refers particularly to the information on rivets ½-inch and larger. He points further to the fact that rivets are much in evidence in the aluminum alloy floor of the recently rehabilitated Smithfield street bridge in Pittsburgh.



A WATCHED pot never boils, neither does a cold ladle make money. If this ladle was typical, it was filled 8 times in 1933 to every 5 times in 1932. Just a rebound from the extreme depths of depression or the first leg on the long road back? Only 1934 will tell

Photo courtesy of Jones & Laughlin Steel Corp.

PRODUCTION AND PRICE GAINS HERALD IRON, STEEL RECOVERY

BY E. C. BARRINGER
Managing Editor, STEEL

MORE pig iron and more steel ingots were produced in 1933 than in 1932, arresting the unbroken decline in production since 1929. The poorest month of 1933 did not plumb the depths of 1932, while the best month exceeded the peak of 1932 by a substantial margin, and almost without exception prices advanced.

On this basis, 1933 was a year of recovery for iron and steel, notwithstanding the general breakdown of banking in March, the confusion attendant upon a change in national administration, and application of a new philosophy of government toward business.

But qualifying this showing was the spotted character of demand, which was restricted principally to automotive steel and tin plate, and the artificial nature of the rise in prices, resulting from codification of the industry.

It will require the perspective of several

years at least to determine whether improvement in 1933 was initiated or accelerated by the government program, including the introduction of collectivism in industry and the appropriation of several billion dollars for job-creating public works, or whether the recovery was effected by the self-healing powers of the industry—in other words, in spite of federal efforts.

The important fact, however, is that the decline in production to the level of the late '90's was checked; subsequent lows established August, 1932, as the bottom of the depression; the descent of prices into unremunerative areas threatening even the surpluses of the strongest entrenched producers was halted; and sentiment was reversed from extreme despondency in the first quarter to pronounced hopefulness in the fourth.

Looking back to 1933, historians of iron and steel unquestionably will point to codification of the industry under the national industrial recovery act not only as the high point of the year but also as the turning point for the industry.

By authority of this act, signed by President Roosevelt June 16, the industry drafted a code on which a hearing was held July 31, and made effective Aug. 19. On expiration of the 90-day trial period, the code was extended on request of the industry to May 31, 1934.

This code established 40 hours as the maximum work week, fixed minimum rates of pay for common labor ranging from 25 cents an hour in the southern district to 40 cents in the north, compelled collective bargaining, committed the industry to an 8-hour day after operations reached 60 per cent, segregated certain trade practices as unfair, provided for the filing of prices with the American Iron and Steel institute, with penalties for infractions, and paved the way for a revision of extras and differentials and their firm application.

Steel Output Up 71%

WITH December estimated, production of open-hearth and bessemer steel ingots and of castings in 1933 was 23,076,000 gross tons, an increase of 71 per cent over the 13,500,000 tons of 1932. Steelmaking capacity was engaged 31 per cent in 1933; in 1932 only 19¾ per cent.

Also with December estimated, output of coke pig iron in 1933 was 13,083,000 gross tons, 58 per cent over the 8,674,067 tons of 1932. The number of blast furnace stacks active on Dec. 31 was 81, almost double the 42 in blast on Dec. 31, 1932.

Except that the timing of pig iron was exactly one month later than steel ingots, the pattern of production of both was identical in 1933. January and February registered encouraging gains over December, March was set back by the banking holiday almost to the depression low of August, 1932, then followed a strong rise in ingots to July, and in pig iron until August, followed by a moderate reaction which was checked in December. Two-thirds of the entire year's production was accomplished in the last half year.

Deficits Sharply Reduced

FINANCIALLY, the position of the steel industry improved progressively through the first three quarters, with a slight setback indicated for the fourth quarter due to curtailed production. Per ton of ingots poured, losses were estimated at $13.70 in the first quarter, $2.86 in the second and only 42 cents in the third.

A natural victim of producers' avidity for business, iron and steel prices progressively gave ground in early 1933, reaching bottom as indicated by the iron and steel composite of STEEL in the first week of April. After bouncing off the bottom for a month the general level of prices embarked in May upon an advance which, except for a slight plateau in late July and early August, was unbroken over the remainder of the year.

STEEL's composite opened the year at $28.83 and closed it at $32.42, an increase of 13 per cent. The average of this composite for all of 1932 was $29.46, and for all 1933 it was $29.83, indicating a 1.3 per cent higher level for last year.

No major outlet for iron and steel snapped back with such vigor as the automobile industry. Final statistics will place 1933 production of passenger cars and trucks in the United States at slightly over 2,000,000 units, an increase of 46 per cent over the 1,370,678 of 1932.

However, this industry's takings of material increased even more than the expansion of its output indicates, since rising prices induced stocking and late in the year more than 300,000 tons of steel was laid down in the Michigan area.

Hit harder by the code than other users because their concessions had been deeper, automotive buyers in the fall obtained modification of their delivered prices, differentials of 15 to 25 cents per 100 pounds over the Pittsburgh base being granted to Detroit and eastern Michigan.

Secondary only to automobiles as a force for recovery was tin plate. A brisker canning industry, plus new use of containers, especially for oil, put the year's production above 3,500,000,000 pounds, compared with 2,312,000,000 pounds in 1932.

Tin plate was advanced in price more sharply than any other finished steel product. After hanging at $4.25 per base box for eight months, the open market went to $4.65 in September and to $5.25 in December, when all long term contracts were declared ended. Inland Steel Co. completed its new tin plate mill at Indiana Harbor, Ind., late in the year.

Spurred by favorable loans from the public works administration at Washington, rail orders began maturing in the closing weeks of 1933, too late to show up in the production total for that year, but promising much for the first quarter of 1934.

The market on standard rails, lowered $3 per ton on Aug. 20, 1932, to $40, was dropped to $37.75 in October, 1933, and subsequently to $36.37½ on Nov. 6 under pressure from the President and on promise from Railroad Co-ordinator Eastman of orders for 844,000 tons of rails, with commensurate track fastenings, largely financed by the government.

Up to Dec. 15, total placement of rails was 203,000 tons, compared with the rolling of 402,566 tons in 1932. In late December some 200,000 tons of rails was actively pending and 500,000 tons of the government's promised business was still to be placed.

Freight car awards in 11 months of 1933 totaled 2144 units against 1739 in all 1932. In 10 months, 13 steam locomotives had been delivered, compared with 80 in 1932. Government financing was being considered to stimulate these markets.

Crippling of financing, accentuated by the securities act of 1933, depressed the line pipe business to negligible proportions. Leading domestic business was 20,000 tons of cast and steel pipe for the Southern Alkali Corp., with a similar tonnage on inquiry from Russia in December. Except in mid-summer, standard pipe was extremely slow. A price advance of $5 to $7 a ton July 1 drove in considerable jobber business.

Cast iron prices were under pressure most of the year, especially in the East, but in the fourth quarter the market stiffened several dollars. The rise at Chicago was $4. Federal loans to municipalities were disappointing in the pipe business they conjured up.

Coast Bridge Largest Award

A DRAGGING market in structural materials in the first half year was brightened by the expectation that the $3,300,000,000 public works program would develop real tonnage in the last half, but the red tape at Washington proved impenetrable.

As compiled weekly by STEEL, awards of structural shapes in 51 weeks of 1933 totaled 750,000 tons, compared with 916,000 tons in all 1932. Also for 51 weeks, reinforcing bar contracts aggregated 180,000

tons, against 207,768 tons in all 1932.

Largest award of the year was the 144,000 tons, including cable, for the San Francisco-Oakland bridge. Even subway construction gave no support to structural shapes in the New York metropolitan district. Relatively best demand for reinforcing materials was for highway mesh and bars.

Chicago Spread on Bars $1

LIKE tank plates, the open market on shapes was unchanged January-September at 1.60c, when a $2 rise was invoked for the fourth quarter. New prices in September maintained the Chicago spread of $2 a ton over Pittsburgh on plates and shapes, but narrowed the differential on bars to $1.

Under the influence of the code, reinforcing bars firmed in the last quarter and went to 1.90c, Pittsburgh, for billet cut lengths, Bethlehem was left the only shape base in the East when Pencoyd was eliminated.

Reflecting directly the comback in automobile production, sheets and bars were relatively the most active finished products in 1933. Autobody sheets became No. 20 cold-rolled, the price easing early in the year from 2.55c to 2.40c, but recovering to 2.75c.

Galvanized sheets touched the year's low in February at 2.50c, and by easy stages climbed to 2.85c in July, and held there. No. 24 hot-rolled annealed tapered to 2.00c, February-May inclusive, but two advances put the market up to 2.25c.

The best year in history for manufacturers of electric refrigerators contributed appreciably to sheet demand. Sheets, like plates, also found a new use in beer barrels.

Few major products benefited more substantially price-wise from the steel code than plates in the East. After two quarters of deep concessions, prices in August were advanced as much as $6 a ton to some consumers. An important change in extras eliminated the overlapping between plates, sheets and strip.

Naval construction stimulated by a grant of $238,000,000 from the public works administration opened up a market for 75,000 tons of steel, chiefly plates, principally for rolling in 1934. Restricted manufacture of steam locomotives made the market for fire box plates negligible. Greater use of welding radically changed specifications for fire box steel.

Wire was featured by heavier use of stainless steel flats and rounds, particularly in the manufacture of refrigerators and oil burners, by notable improvement in roller bearing steel and in increased demand for nails for the government's reforestation program.

A heavy movement of low-price foreign material affected the market on wire products as far inland as Memphis, Tenn., and resulted in a reduction of $2 to $3 a ton early in the year, which was more than offset by advances of $5 to $8 Dec. 4.

During the year, hot-rolled strip was advanced a total of $7 a ton and cold-rolled strip $12. Bolts and nuts improved from 70, 10 and 5 off early in the year to 70 off at the close. Rivets twice were advanced 25 cents, closing at 2.75c, Pittsburgh.

Because of heavy stocks at furnaces, improvement in merchant iron production lagged behind nonmerchant, but even so the situation was more favorable than in 1932. The use of low-price scrap also operated against merchant iron. Shipments increased even more than production and consumer stocks became more nearly normal.

But there was compensation for merchant furnaces in rising prices. At Chicago, No. 2 foundry and malleable iron were advanced $2 a ton, concluding the year at $17.50. Three $1 increases raised the foundry market at Pittsburgh to $18.

In eastern Pennsylvania foundry iron sank in the first quarter to $12.50, but recovered $6 to $18.50. Most imported iron followed the domestic market in the East. Sparrows Point, Md., became an iron basing point under the code.

Scrap Ends Year Strong

ALWAYS more volatile, scrap fluctuated more than any other material in 1933. Typical was the market on No. 1 heavy melting steel at Pittsburgh, which held at $8.35 during January and February, then shot up to $13.75 by August, eased off about $1.50 by early December, then began a slow rise.

Domestic demand for scrap tapered in the third quarter as the peak of steelworks operations passed. Export demand, however, was good all year, Japan, Poland and Italy being the principal buyers. Exports at 600,000 tons were more than double 1932 and exceeded even record 1929.

After ruinously low prices early in the year, the beehive coke market catapulted to levels more than 100 per cent higher by the fourth quarter. Connellsville beehive furnace coke pushed up from $1.75 to $3.75 and foundry from $2.25 to $4.25. Most by-product coke was advanced 50 to 75 cents a ton beginning with the fourth quarter.

Semifinished steel was generally quiet in 1933. Sheet bars, billets and slabs were weak at $26, Pittsburgh, through the early months of the year, but the market firmed in the last half. Skelp was advanced $2 to 1.60c, Pittsburgh. Wire rods declined $2 in January to $35, but recovered to $36 in December.

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BK. PRICE and L. E. Browne, New York; W. G. Gude, Chicago; Edward A. France Jr., Pittsburgh, and A. J. Hain, G. H. Manlove and I. H. Such, Cleveland, collaborated in this review of the 1933 market situation.

Refractory Prices Advanced

FOLLOWING a dull spring and a chaotic price situation refractory brick experienced brisk demand in midsummer when many idle blast and open-hearth steel furnaces were suddenly pressed into service. Fire clay and silica brick were advanced $5 twice, magnesite brick $3.50, chrome $2.50, dead burned magnesite $2, second quality fire brick $7. Alabama was segregated from other districts east of the Mississippi.

Coke oven by-product prices generally were steady during the year.

Opening at 20.00c, benzol advanced 2 cents a gallon late in the first quarter and remained 22.00c the remainder of the period.

Toluol was unchanged, but firm.

Sulphate of ammonia advanced from $1.10 per 100 pounds, Atlantic port, to $1.25 at the year end.

Naphthalene also advanced sharply in the last quarter, both flakes and balls, the full advantage of which will be effective on 1934 volume.

Curtailed production had a steadying influence on prices, there being times when spot supply of toluol and xylol was hardly ample.

Sharp recovery of prices from their record 1932 lows was the outstanding development in nonferrous metals, eased by a substantial increase in demand when the threat of inflation was at its height. The year closed with the market steadier and prices soft, but still above 1932.

Copper moved rapidly upward, from the 5.00c level in April to 9.00c in July. The 4-cent tariff continued to bar foreign copper.

Zinc by mid-July at 5.00c was more than double the all-time low of 2.30c in 1932, and buying expanded rapidly. Stocks dropped to 45,000 tons by Nov. 1, but tended upward in the final 60 days.

Lead also advanced sharply, reaching 4.50c, New York, and 4.35c, East St. Louis, in July against the 1932 lows of 2.50c, East St. Louis, and 2.65c, New York. Buying also was heavy during the middle months of the year and stocks declined.

Straits tin, at one time available at 18.35c in 1932, had climbed to approximately 56.00c by early November as a result of marked depreciation of the dollar in terms of sterling, and the activities of the international tin committee in cutting available supplies.

Nickel held through the year at 35.00c. Aluminum was openly quoted at 22.90c but was widely obtainable at several cents less.

Domestic Average Monthly Prices in 1933

Base or furnace, unless otherwise specified. Scrap is delivered to consumers

PITTSBURGH

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Bessemer Pig Iron, delivered	$15.76	$15.76	$15.76	$16.26	$16.66	$17.26	$17.86	$18.26	$19.26	$19.26	$19.26	$19.26
Basic Pig Iron, delivered	14.00	14.00	14.00	14.00	14.40	15.00	15.60	16.00	17.00	17.00	17.00	17.00
No. 2 Foundry Pig Iron, delivered	15.76	15.76	15.76	15.76	16.16	16 76	17.76	17.76	18.76	18.76	18.76	18.26
Malleable Pig Iron, delivered	14.50	14.50	14.50	14.50	14.90	15.50	16.10	16.50	17.50	17.50	17.50	17.50
Bessemer Ferrosilicon, 10 per cent (Jackson county base)	20.50	20.50	20.50	20.50	20.50	20.75	22.40	24.65	27.00	27.25	27.25	27.25
Billets, Bessemer and Open-Hearth	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00
Sheet Bars, Bessemer and Open-Hearth	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
Wire Rods	36.20	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	36.00
Furnace Coke, spot	$1.75	$1.75	$1.75	$1.75	$1.75	$1.86	$2.40	$2.75	$2.50	$3.25	$3.75	$3.75
Foundry Coke, spot	2.50	2.50	2.25	2.25	2.25	2.40	2.85	3.10	3.15	3.85	4.25	4.25
Structural Shapes	1.60c	1.60c	1.60c	1.60c	1.60c	1.60c	1.60c	1.60c	1.60c	1.70c	1.70c	1.70c
Plates	1.60	1.60	1.60	1.55	1.50	1.55	1.60	1.60	1.60	1.70	1.70	1.70
Bars	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.75	1.75	1.75
Cold-Finished Steel Bars	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.95	1.95	1.95	1.95	1.95
Strip, Hot-Rolled	1.45	1.45	1.45	1.45	1.55	1.55	1.60	1.65	1.70	1.75	1.75	1.75
Strip, Cold-Rolled	1.95	1.80	1.85	1.80	1.90	2.00	2.25	2.25	2.30	2.40	2.40	2.40
Steel Pipe, 1 to 3-inch, discount	67½%	67½%	67½%	71%	71%	71%	67½%	67½%	67½%	67½%	67½%	67½%
Standard Spikes	2.40c	2.40c	2.25c	2.25c	2.15c	2.15c	2.40c	2.40c	2.40c	2.40c	2.40c	2.40c
Wire Nails	$1.90	$1.85	$1.85	$1.85	$1.85	$1.85	$2.05	$2.10	$2.10	$2.10	$2.10	$2.35
Plain Wire	2.15c	2.10c	2.10c	2.10c	2.10c	2.10c	2.10c	2.10c	2.10c	2.10c	2.10c	2.20c
Structural Rivets	2.25	2.25	2.25	2.25	2.25	2.35	2.50	2.50	2.50	2.60	2.75	2.75
No. 24 Hot-Rolled Annealed Sheets	2.05	2.00	2.00	2.00	2.00	2.10	2.25	2.25	2.25	2.25	2.25	2.25
No. 9-10 Blue Annealed Sheets	1.65	1.60	1.55	1.55	1.55	1.65	1.75	1.65	1.70	1.75	1.75	1.75
No. 24 Galvanized Sheets	2.70	2.50	2.60	2.65	2.70	2.70	2.85	2.85	2.85	2.85	2.85	2.85
Tin Plate, base box	$4.25	$4.25	$4.25	$4.25	$4.25	$4.25	$4.25	$4.25	$4.65	$4.65	$4.65	$5.25
Heavy Melting Steel Scrap	$8.35	$8.35	$8.75	$9.90	$11.65	$11.65	$12.70	$13.75	$13.00	$12.45	$11.65	$11.50
Low Phosphorus Scrap	10.00	10.25	10.70	11.10	13.55	13.70	14.55	16.00	15.10	14.30	13.50	13.50
No. 1 Cast Scrap	8.55	9.00	9.00	9.00	10.10	10.40	10.65	10.60	10.60	11.20	11.00	11.00

CHICAGO

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
No. 2 Foundry and Malleable Pig Iron	$15.50	$15.50	$15.50	$15.50	$15.90	$16.00	$16.75	$17.00	$17.50	$17.50	$17.50	$17.50
Southern No. 2 Pig Iron, Delivered	16.01	16.01	16.01	16.01	16.25	16.50	17.00	17.16	18.16	18.16	18.16	18.16
Lake Superior Charcoal Iron	23.04	23.04	23.04	23.04	23.04	23.04	23.04	23.04	23.54	23.54	23.54	23.54
Bars	1.70c	1.70c	1.70c	1.70c	1.70c	1.70c	1.70c	1.70c	1.70c	1.80c	1.80c	1.80c
Plates	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.65	1.75	1.75	1.75
Structural Shapes	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.65	1.75	1.75	1.75
Rail Steel Bars	1.50	1.45	1.45	1.45	1.50	1.50	1.50	1.50	1.60	1.70	1.70	1.70
Bar Iron	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	*1.60	1.60	1.60	1.60
No. 24 Hot-Rolled Annealed Sheets	2.20	2.10	2.10	2.10	2.15	2.25	2.35	2.35	2.35	2.35	2.35	2.35
*Beginning September, Terre Haute, Ind., base quoted; freight to Chicago 18 cents.												
Heavy Melting Steel Scrap	$5.25	$5.25	$5.25	$6.55	$8.70	$8.80	$10.45	$10.40	$9.95	$9.35	$8.35	$8.75
No. 1 Railroad Wrought Scrap	5.00	5.00	5.00	5.50	8.10	8.10	10.20	10.35	9.25	9.10	8.10	7.50
Rails for Rolling	8.00	7.75	7.95	8.50	10.25	10.25	11.15	11.25	11.25	11.10	10.25	10.25
Car Wheels, Iron	7.65	8.15	8.35	8.75	9.75	9.75	9.75	9.75	9.75	9.50	9.25	9.75
No. 1 Machinery Cast Scrap	5.95	6.00	6.20	7.15	8.75	8.75	9.90	10.50	9.85	9.25	8.00	8.50

EASTERN PENNSYLVANIA

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Basic Pig Iron	$13.50	$13.50	$13.50	$14.19	$15.44	$16.19	$16.79	$17.20	$17.76	$17.76	$17.76	$18.76
No. 2X Foundry Pig Iron, delivered, Philadelphia	13.76	13.76	13.76	14.51	15.95	16.76	17.28	17.88	18.63	18.63	18.63	19.63
Standard Low Phosphorus Pig Iron	20.75	20.50	20.50	20.50	21.68	22.00	22.80	23.50	23.13	23.13	23.13	24.13
Tank Plates, delivered, Philadelphia	1.66c	1.595c	1.595c	1.495c	1.495c	1.495c	1.495c	1.795c	1.795c	1.885c	1.885c	1.885c
Structural Shapes, delivered, Philadelphia	1.70	1.65	1.65	1.65	1.65	1.65	1.65	1.815	1.815	1.905	1.905	1.905
Bars, delivered, Philadelphia	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	2.04	2.04	2.04
Bar Iron, common, delivered, Philadelphia	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.74	1.74	1.74	1.74
No. 10 Blue Annealed Sheets, delivered, Philadelphia	1.96	1.86	1.86	1.86	1.86	1.86	2.11	2.11	2.15	2.19	2.19	2.19
No. 1 Heavy Melting Steel Scrap, delivered	$6.50	$6.50	$6.50	$6.90	$9.00	$9.50	$10.55	$12.00	$10.70	$10.20	$ 9.55	$10.50
No. 1 Railroad Wrought Scrap, delivered	6.50	6.50	6.75	7.35	10.25	10.25	11.60	13.00	11.60	10.75	10.15	11.00
No. 1 Cupola Cast Scrap, delivered	9.00	9.00	9.00	9.10	10.25	10.35	11.20	11.75	12.40	12.00	11.95	12.00

COAL TAR PRODUCTS

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Benzol, per gallon producers' plants, tank lots	$0.20	$0.20	$0.22	$0.22	$0.22	$0.22	$0.22	$0.22	$0.22	$0.22	$0.22	$0.22
Toluol, per gallon producers' plants, tank lots	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Solvent Naphtha, per gallon producers' plants, tank lots	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Phenol, per pound producers' plants in 250 lb. drums	0.163	0.163	0.163	0.163	0.163	0.163	0.163	0.163	0.163	0.163	0.163	0.163
Naphthalene Flakes, per pound producers' plants	0.0475	0.0475	0.0475	0.0475	0.0475	0.0475	0.0475	0.0475	0.0475	0.06	0.06	0.06
Naphthalene Balls, per pound producers' plants	0.0575	0.0575	0.0575	0.0575	0.0575	0.0575	0.0575	0.0575	0.0575	0.0725	0.0725	0.0725
Sulphate of Ammonia, per 100 lbs., Atlantic seaboard	1.10	1.10	1.10	1.10	1.15	1.15	1.20	1.20	1.20	1.20	1.25	1.25

NONFERROUS METALS

Prompt, wholesale prices in cents per pound

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Tin, Straits, spot, New York	22.694	23.505	24.198	27.119	36.041	44.136	46.295	44.802	46.660	47.838	53.013	52.876
Copper, electro, delivered Connecticut	5.000	5.000	5.271	5.660	6.947	8.000	8.898	9.000	9.000	8.235	8.167	8.000
Zinc, prime western, East St. Louis	3.032	2.677	2.988	3.302	3.807	4.431	4.881	4.915	4.701	4.748	4.518	4.500
Lead, open market, East St. Louis	2.875	2.875	3.023	3.135	3.524	4.023	4.302	4.350	4.350	4.181	4.146	4.030
Lead, open market, New York	3.000	3.000	3.148	3.260	3.654	4.173	4.452	4.500	4.500	4.318	4.294	4.130
Aluminum, 98-99 per cent, del.	22.900	22.900	22.529	20.400	21.150	21.900	21.400	21.400	21.400	21.400	21.400	21.400
Antimony, spot, New York	5.720	5.737	5.914	5.845	6.255	6.487	7.104	7.005	6.880	6.820	7.077	7.125
Nickel, ingot	35.000	35.000	35.000	35.000	35.000	35.000	35.000	35.000	35.000	35.000	35.000	35.000

Prices Tell Market History

Ores and Alloys

Per Gross Ton

Iron Ore Prices at Date of Buying Movement, del. lower lake ports

Season	Date buying movement	Old range Bessemer Ton	Old range Bessemer Cents per unit	Old range Nonbessemer Ton	Old range Nonbessemer Cents per unit	Mesabi Bessemer Ton	Mesabi Bessemer Cents per unit	Mesabi Nonbessemer Ton	Mesabi Nonbessemer Cents per unit	Iron prices, Valley Bessemer	Iron prices, Valley No. 2 Foundry
1933	June 12, 1933	$ 4.80	9.320	$4.65	9.029	$4.65	9.029	$4.50	8.738	$16.00	$15.50
1932	June 3, 1932	4.80	9.320	4.65	9.029	4.65	9.029	4.50	8.738	14.50	14.50
1931	April 15, 1931	4.80	9.320	4.65	9.029	4.65	9.029	4.50	8.738	17.00	17.00
1930	April 1, 1930	4.80	9.320	4.65	9.029	4.65	9.029	4.50	8.738	19.00	18.50
1929	March 22, 1929	4.80	9.320	4.65	9.029	4.65	9.029	4.50	8.738	18.50	18.00
1928	April 16, 1928	4.55	8.835	4.40	8.544	4.40	8.544	4.25	8.252	17.50	17.25
1927	April 8, 1927	4.55	8.835	4.40	8.544	4.40	8.544	4.25	8.252	19.50	18.50
1926	March 17, 1926	4.55	8.835	4.40	8.544	4.40	8.544	4.25	8.252	21.00	20.50
1925	April 4, 1925	4.55	8.835	4.40	8.544	4.40	8.544	4.25	8.252	22.00	21.00
1924	March 24, 1924	5.65	11.364	4.90	10.680	5.40	10.909	4.75	10.388	23.00	22.00
1923	March 24, 1923	6.45	12.818	5.70	12.233	6.20	12.364	5.55	11.942	31.00	31.00
1922	June 9, 1922	5.95	11.909	5.20	11.262	5.70	11.454	5.05	10.971	25.00	24.00
1921	June 16, 1921	6.45	12.818	5.70	12.233	6.20	12.364	5.55	11.942	23.00	22.50
1920	Feb. 2, 1920	7.45	14.636	6.70	14.175	7.20	14.182	6.55	13.883	41.00	40.00
1919	April 28, 1919	6.45	12.818	5.70	12.233	6.20	12.364	5.55	11.942	27.95	26.75
1918 Govt. Prices	Oct. 1, 1918	6.65	13.182	5.90	12.621	6.40	12.727	5.75	12.330	35.20	34.00
	July 1, 1918	6.40	12.727	5.65	12.136	6.15	12.273	5.50	11.845	35.20	33.00
	April 1, 1918	5.95	11.909	5.20	11.262	5.70	11.454	5.05	10.971	35.20	33.00
1917	Nov. 22, 1916	5.95	11.909	5.20	11.262	5.70	11.454	5.05	10.971	30.00	26.00
1916	Dec. 7, 1915	4.45	9.181	3.70	8.349	4.20	8.727	3.55	8.058	18.50	18.00
1915	April 19, 1915	3.75	7.909	3.00	6.990	3.45	7.455	2.80	6.699	13.60	12.75
1914	May 1, 1914	3.75	7.909	3.00	6.990	3.50	7.445	2.85	6.699	14.00	13.25
1913	Nov. 19, 1912	4.40	9.091	3.60	8.155	4.15	8.636	3.40	7.767	17.25	17.50
1912	March 20, 1912	3.75	7.909	3.00	6.990	3.50	7.455	2.85	6.690	14.25	13.25
1911	April 21, 1911	4.50	9.273	3.70	8.349	4.25	8.818	3.50	7.961	15.00	13.75
1910	Dec. 24, 1909	5.00	10.182	4.20	9.320	4.75	9.727	4.00	8.932	19.00	17.25

Manganese Ore

Dollars Per Gross Ton, Duty Paid, North Atlantic Ports, on Basis of 50 Per Cent Ore

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933	$19.95	$19.95	$19.95	$19.95	$19.95	$20.20	$20.45	$21.45	$21.45	$21.70	$21.70	$21.70
1932	22.70	22.70	22.70	22.70	21.70	21.70	21.70	21.70	21.20	21.20	21.20	20.70
1931	24.20	24.20	23.70	23.70	23.70	23.70	23.70	23.70	23.70	22.70	22.70	22.70
1930	24.95	24.70	24.70	24.70	24.70	24.70	24.70	24.20	24.20	24.20	24.20	24.20
1929	27.70	27.70	27.70	27.70	27.70	27.70	26.70	26.70	26.70	25.70	25.70	25.70
1928	30.20	30.20	30.20	30.20	30.20	30.20	30.20	30.20	30.20	30.20	29.20	29.20
1927	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70
1926	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70
1925	32.20	32.70	33.20	33.20	32.70	32.20	32.20	32.20	31.70	31.70	31.70	31.70
1924	31.20	32.70	23.20	32.20	32.20	31.70	30.70	30.20	30.20	30.20	31.70	32.20
1923	29.45	29.45	31.70	33.20	32.70	32.95	32.95	32.95	31.70	31.70	31.70	31.70
1922	10.50	11.00	12.50	12.75	12.75	13.25	13.50	13.75	*14.35	25.50	25.50	25.50
1921	18.75	17.50	17.25	14.00	14.00	12.50	12.50	12.50	12.50	12.50	12.50	12.00
1920	30.00	38.75	38.75	32.25	35.00	37.50	42.25	35.00	35.00	32.75	25.00	21.25
1919	55.50	38.75	37.50	30.00	30.00	30.00	31.25	31.25	30.00	27.50	27.50	27.50
1918	63.75	63.75	60.00	65.00	65.00	65.00	68.50	65.00	65.00	65.00	62.50	55.00
1917	30.00	30.00	40.00	40.00	50.00	50.00	50.00	50.00	60.00	60.00	60.00	60.00
1916	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	30.00	30.00	30.00	30.00
1915	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	22.50	22.50	22.50	22.50

*After September, 1922, duty 1c per pound metallic content, $11.20 per gross ton 50 per cent ore.

Bessemer Ferrosilicon, 10 Per Cent

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933	$20.50	$20.50	$20.50	$20.50	$20.50	$20.75	$22.40	$24.65	$27.00	$27.75	$27.75	$27.75
1932	23.00	22.00	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50
1931	25.00	25.00	25.00	25.00	25.00	25.00	25.00	24.00	23.00	23.00	23.00	23.00
1930	30.00	30.00	30.00	30.00	30.00	29.50	29.00	29.00	25.00	25.00	25.00	25.00
1929	31.00	31.00	31.00	31.00	31.00	31.00	31.00	30.20	30.00	30.00	30.00	30.00
1928	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
1927	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	33.50	32.00	30.00
1926	35.00	35.50	36.00	34.40	33.00	33.00	33.00	33.00	33.00	33.25	24.00	34.00
1925	39.50	39.50	39.50	37.50	35.50	35.50	35.50	35.50	34.00	33.50	34.25	35.00
1924	41.50	42.50	42.25	41.50	40.30	39.50	39.50	39.50	39.50	39.50	39.50	39.50
1923	44.50	45.50	47.10	48.50	48.50	48.00	46.50	43.50	43.50	43.50	41.50	41.50
1922	38.50	37.50	36.50	37.25	40.50	41.50	41.50	42.50	48.50	50.00	48.00	44.50
1921	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	52.50	57.50
1920	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50
1919	54.00	54.00	52.95	47.40	45.00	47.40	49.75	49.75	49.75	49.75	54.75	58.50
1918	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	57.00	57.00	57.00
1917	42.00	42.00	49.80	57.00	67.00	82.50	92.25	95.00	95.00	95.00	55.00	55.00
1916	28.00	28.00	31.00	31.00	32.00	32.00	32.00	31.80	30.25	30.50	34.60	42.00

Ferrosilicon, 50 Per Cent

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933	$74.50	$74.50	$74.50	$74.50	$74.50	$74.50	$74.50	$74.50	$74.50	$74.50	$74.50	$74.50
1932	77.50	77.50	77.50	77.50	77.50	77.50	77.50	77.50	77.50	77.50	77.50	76.30
1931	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	77.50
1930	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50
1929	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50
1928	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50
1927	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00
1926	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00
1925	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00
1924	75.00	75.00	75.00	75.00	75.00	75.00	74.50	74.50	74.50	75.00	75.00	82.50
1923	85.00	90.00	92.50	95.00	95.00	87.50	82.50	82.50	82.50	82.50	80.00	75.00
1922	57.50	55.00	54.00	55.00	57.50	57.50	55.00	55.00	55.00	70.00	82.50	82.50
1921	80.00	92.00	93.00	90.00	80.00	75.00	75.00	65.00	65.00	60.00	60.00	57.00
1920	82.00	80.00	83.00	80.00	83.00	82.50	82.50	80.00	82.50	82.50	80.00	80.00
1919	145.00	125.00	115.00	110.00	110.00	85.00	80.00	78.00	80.00	85.00	80.00	80.00
1918	175.00	175.00	177.50	172.50	170.00	170.00	165.00	153.50	150.00	151.00	150.00	150.00
1917	122.50	156.25	175.00	187.50	230.00	230.00	237.50	225.00	212.50	171.25	157.50	172.50
1916	83.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00	94.25	95.00	95.00

Spiegeleisen

At Producers' Furnaces

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$27.00	$27.00	$27.00	$27.00	$27.00	$27.00
1932.....	27.00	27.00	27.00	27.00	27.00	26.50	25.00	25.00	25.00	25.00	24.25	24.00
1931.....	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	27.00
1930.....	34.00	34.00	34.00	34.00	34.00	34.00	33.00	33.00	33.00	33.00	33.00	30.00
1929.....	34.00	34.00	34.00	34.00	34.00	34.00	34.00	33.20	33.50	34.00	34.00	34.00
1928.....	32.00	32.00	32.00	32.00	32.00	32.00	33.00	33.00	33.00	33.00	33.00	34.00
1927.....	37.00	37.00	37.00	37.00	35.50	34.80	34.00	33.35	33.00	30.15	30.00	31.00
1926.....	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	38.75	37.00
1925.....	32.00	33.00	33.00	33.00	33.00	32.00	31.50	32.25	33.00	33.00	34.00	34.00
1924.....	39.00	39.00	38.00	38.00	36.75	36.00	35.00	32.50	32.00	31.00	31.75	31.00
1923.....	34.90	35.75	37.25	39.25	43.00	46.00	45.00	45.00	43.50	40.00	39.00	38.00
1922.....	25.50	28.00	28.00	30.00	35.00	35.25	35.00	37.00	38.00	37.75	36.80	35.50
1921.....	46.25	37.75	34.20	32.00	31.75	29.60	27.50	26.20	25.25	24.85	25.00	25.00
1920.....	46.60	57.60	60.40	66.85	75.00	75.00	75.00	79.35	82.00	80.00	74.35	57.90
1919.....	*67.50	*52.50	*42.50	*34.50	*31.35	*27.50	34.00	34.00	34.00	34.00	34.00	39.00
1918.....	59.00	59.00	65.50	*70.00	*71.00	*75.00	*75.00	*75.00	*75.00	*75.00	*75.00	*72.50
1917.....	57.50	66.25	77.50	76.75	78.00	83.00	85.00	81.25	80.50	73.50	63.25	60.00
1916.....	32.50	42.50	55.00	60.00	60.00	55.00	47.50	47.50	45.00	40.00	45.00	50.00
1915.....	25.00	25.50	26.00	26.00	26.00	26.00	26.00	26.00	29.00	30.00	30.00	30.00

*Prices from and including April, 1918, and to and including June, 1919 are for 16 per cent spiegeleisen. All other prices apply to 20 per cent metal.

Ferromanganese, delivered Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$73.24	$73.24	$73.24	$73.24	$73.24	$73.24	$84.44	$87.24	$87.24	$87.24	$87.24	$87.24
1932.....	79.85	80.24	80.24	80.24	80.24	74.99	73.24	$73.24	73.24	73.24	73.24	73.24
1931.....	89.79	89.79	89.79	89.79	89.79	89.79	89.79	89.79	89.79	89.79	89.79	79.79
1930.....	104.79	103.79	103.79	103.79	103.79	103.79	103.79	103.79	103.79	103.79	103.79	93.25
1929.....	109.79	109.79	109.79	109.79	109.79	109.79	109.79	109.79	109.79	109.79	109.79	104.79
1928.....	104.79	104.79	104.79	104.79	108.19	109.79	109.79	109.79	109.79	109.79	109.79	109.79
1927.....	104.79	104.79	104.79	104.79	98.54	94.79	94.79	94.79	94.79	94.79	94.79	103.42
1926.....	119.79	119.79	102.29	92.79	92.79	92.79	92.79	92.79	92.79	99.79	104.79	104.79
1925.....	116.79	119.79	119.79	119.79	119.79	119.79	119.79	119.79	119.79	119.79	119.79	119.79
1924.....	113.79	112.29	112.29	112.29	112.29	112.79	110.79	98.79	97.79	104.79	107.29	109.79
1923.....	109.79	112.29	120.79	124.79	129.79	129.79	122.29	122.29	114.79	112.79	113.79	113.79
1922.....	61.90	65.32	67.82	69.07	72.32	72.82	72.29	72.29	†80.59	105.47	104.92	104.92
1921.....	101.00	96.85	89.00	87.50	83.00	76.50	75.00	70.75	64.75	61.65	60.00	60.00
1920.....	146.00	160.00	172.00	200.00	200.00	198.00	190.00	193.75	172.40	156.40	153.00	120.00
1919.....	*212.50	165.00	134.00	113.75	110.00	111.75	111.00	110.00	105.00	110.00	110.00	121.00
1918.....	250.00	250.00	250.00	250.00	*250.00	*250.00	*250.00	*250.00	*250.00	*250.00	*250.00	*236.00
1917.....	175.00	192.50	212.50	250.00	375.00	400.00	400.00	387.50	380.00	300.00	247.50	242.50
**1916...	139.88	215.13	334.75	412.50	347.75	244.88	198.75	173.18	167.67	160.00	155.00	162.50
1915.....	68.00	78.80	95.00	95.00	97.00	105.00	103.57	101.36	110.00	109.64	100.42	103.04
1914.....	43.57	39.01	39.02	38.68	38.16	38.00	37.54	102.08	93.45	70.80	67.85	68.00

*Prices from May, 1918, to January, 1919, inclusive, were based on 70 per cent ferromanganese. All other prices in above table were based on 80 per cent metal.

†Duty of 1¾ cents per pound contained manganese became effective on ferromanganese Sept. 21, 1922.

**Quotations seaboard to January, 1917; delivered Pittsburgh thereafter.

Pig Iron

Per Gross Ton

Bessemer, delivered Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$15.76	$15.76	$15.76	$16.26	$16.66	$17.26	$17.86	$18.26	$19.26	$19.26	$19.26	$19.26
1932.....	17.26	16.96	16.76	16.76	16.13	15.95	15.76	15.76	15.76	15.76	15.76	15.76
1931.....	18.76	18.51	18.26	18.26	18.26	18.26	18.26	18.26	18.26	18.16	17.76	17.51
1930.....	20.76	20.76	20.76	20.76	20.76	20.76	20.46	20.26	20.13	19.36	18.63	18.76
1929.....	19.96	19.86	20.11	20.26	20.56	20.76	20.76	20.76	20.76	20.76	20.76	20.76
1928.....	19.26	19.26	19.21	19.26	19.26	18.76	18.76	18.76	18.86	19.11	19.96	20.01
1927.....	21.26	20.76	21.16	21.26	20.86	20.66	20.26	20.26	19.86	19.76	19.76	19.26
1926.....	22.76	22.76	22.76	21.56	21.01	20.76	20.46	19.76	19.96	20.86	22.01	21.51
1925.....	24.66	24.66	23.96	26.76	21.66	20.76	20.76	20.76	21.06	21.56	22.66	22.76
1924.....	24.66	25.01	24.86	24.61	24.06	23.26	21.66	21.76	21.76	21.76	22.11	23.26
1923.....	29.27	29.57	31.67	32.77	32.07	30.27	28.52	28.07	28.27	27.27	25.47	24.27
1922.....	21.51	21.31	21.21	22.46	26.46	26.96	26.76	29.16	35.27	35.12	27.77	30.33
1921.....	33.96	30.96	28.96	27.46	26.06	25.06	22.96	21.96	22.46	22.06	21.96	21.96
1920.....	40.00	43.15	43.40	43.50	43.90	44.25	46.80	49.50	50.45	50.17	42.33	36.96
1919.....	33.60	33.60	32.55	29.35	29.35	29.35	29.35	29.35	29.35	29.35	32.00	36.65
1918.....	37.25	37.25	37.25	36.15	36.15	36.40	36.60	36.60	36.60	36.60	36.60	36.60
1917.....	35.95	35.95	37.45	42.20	44.95	55.20	57.95	55.55	48.27	37.25	37.25	37.25
1916.....	21.32	21.45	21.55	21.95	21.95	21.95	21.95	21.95	22.20	24.33	30.35	35.95
1915.....	14.70	14.63	14.55	14.55	14.55	14.58	14.88	15.89	16.80	16.95	17.45	19.70
1914.....	15.00	15.09	15.15	14.90	14.90	14.90	14.90	14.90	14.90	14.85	14.70	14.70
1913.....	18.15	18.15	18.15	17.90	17.90	17.26	16.65	16.52	16.65	16.60	16.09	15.90
1912.....	15.15	15.00	15.02	15.15	15.15	15.15	15.15	15.43	15.93	17.75	18.05	18.15
1911.....	15.90	15.90	15.90	15.90	15.90	15.90	15.90	15.90	15.90	15.39	15.10	15.15
1910.....	19.90	19.42	18.90	18.15	17.09	16.73	16.40	16.21	15.90	15.90	15.90	15.90
1909.....	17.34	16.78	16.34	15.80	15.48	16.13	16.37	17.13	18.33	19.68	19.80	19.90
1908.....	19.00	17.90	17.86	17.49	16.92	16.90	16.73	16.11	15.90	15.48	16.74	17.40
1907.....	22.92	22.78	22.85	22.16	24.10	24.10	23.30	22.90	22.90	22.80	20.60	19.90
1906.....	17.32	17.29	17.26	17.25	17.24	17.38	17.57	17.96	18.44	20.06	21.96	22.75
1905.....	16.85	16.45	16.35	16.30	16.20	15.65	15.00	15.40	15.90	16.50	17.70	18.10
1904.....	13.60	13.35	13.85	14.10	13.60	12.60	12.50	12.65	12.75	13.35	15.25	16.60
1903.....	22.35	22.35	22.00	21.60	20.00	19.85	19.00	17.85	16.35	15.85	15.25	14.35
1902.....	16.70	16.93	17.56	18.37	20.95	21.25	22.00	21.75	21.75	21.95	22.25	22.12
1901.....	13.25	13.60	16.56	16.69	16.65	15.94	16.00	15.90	15.71	15.90	16.10	16.35
1900.....	24.90	24.90	24.90	24.90	24.90	19.75	18.00	16.05	14.00	13.25	13.65	13.55
1899.....	11.00	11.75	14.00	15.15	16.25	19.00	20.75	22.00	23.50	24.00	24.50	25.00
1898.....	9.90	10.15	10.40	10.50	10.50	10.40	10.35	10.40	10.40	10.30	10.20	10.65
1897.....	10.50	10.65	10.50	10.00	9.35	9.35	9.00	9.05	10.00	10.25	10.25	9.90
1896.....	12.30	12.80	12.00	13.15	12.75	12.40	12.20	11.45	11.25	11.50	12.30	11.40
1895.....	10.00	10.15	10.25	10.75	11.25	12.00	14.00	14.75	17 25	15.75	14.00	12.25

Market History—

Malleable, f.o.b. Valley

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933	$14.50	$14.50	$14.50	$14.50	$14.90	$15.50	$16.10	$16.50	$17.50	$17.50	$17.50	$17.50
1932	16.00	15.50	15.50	15.50	15.00	14.50	14.50	14.50	14.50	14.50	14.50	14.50
1931	17.50	17.25	17.00	17.00	17.00	17.00	17.00	17.00	17.00	16.90	16.50	16.00
1930	19.00	19.00	19.00	19.00	19.00	19.00	18.70	18.50	18.35	17.80	17.50	17.50
1929	18.00	18.00	18.10	18.50	18.80	19.00	19.00	19.00	19.00	19.00	19.00	19.00
1928	17.25	17.25	17.25	17.25	17.25	17.00	17.00	17.00	17.10	17.35	17.90	18.00
1927	18.50	18.10	18.40	18.50	18.50	18.25	17.50	17.50	17.50	17.50	17.50	17.25
1926	20.50	20.50	20.50	19.30	19.00	18.00	17.80	17.50	17.70	18.35	19.75	19.00
1925	22.75	22.25	21.25	20.10	19.00	18.50	18.50	18.50	18.80	19.35	20.35	20.50
1924	22.00	23.00	22.50	22.20	21.30	19.75	19.00	19.00	19.50	19.50	19.75	20.50
1923	27.25	27.25	29.20	31.00	30.20	28.25	25.50	24.70	24.60	23.25	20.40	22.00
1922	19.45	19.00	19.00	20.40	24.60	24.50	25.00	28.60	34.00	32.30	29.25	26.25
1921	32.25	28.75	26.40	24.90	23.75	22.60	20.40	20.00	20.40	20.20	20.00	20.00
1920	38.95	41.60	42.35	41.60	41.60	41.85	43.40	48.25	50.50	48.25	40.40	36.00
1919	31.50	31.50	30.45	27.25	27.25	27.25	27.25	27.25	27.25	27.75	31.75	36.40
1918	33.50	33.50	34.45	34.45	34.45	34.65	34.90	34.90	34.90	34.50	34.50	34.50
1917	31.00	33.50	36.00	39.00	42.70	40.10	53.00	54.00	49.60	34.25	33.50	33.50
1916	19.00	18.65	18.50	18.50	18.50	18.50	18.50	18.50	18.55	20.15	25.85	30.75
1915	12.75	12.75	12.85	12.50	12.50	12.50	12.65	13.75	14.50	14.60	15.50	17.90
1914	13.15	13.19	14.15	13.25	13.25	13.00	13.00	13.00	13.00	12.90	12.75	12.75
1913	17.25	17.20	16.75	15.75	14.85	14.40	14.15	14.00	14.05	14.25	13.85	13.50

Basic, Valley

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933	$14.00	$14.00	$14.00	$14.00	$14.40	$15.00	$15.60	$16.00	$17.00	$17.00	$17.00	$17.00
1932	15.00	15.00	15.00	15.00	15.00	14.50	14.00	14.00	14.00	14.00	14.00	14.00
1931	17.00	16.75	16.75	17.00	17.00	17.00	17.00	17.00	17.00	16.60	15.00	15.00
1930	18.50	18.50	18.50	18.50	18.50	18.50	18.20	18.00	17.75	17.00	17.00	17.00
1929	17.50	17.50	17.60	18.00	18.30	18.50	18.50	18.50	18.50	18.50	18.50	18.50
1928	17.00	17.00	17.00	16.75	16.20	15.80	15.95	16.00	16.10	16.85	17.70	17.50
1927	18.50	17.85	18.50	19.00	18.10	17.90	17.50	17.50	17.15	17.00	17.00	17.00
1926	20.00	19.50	21.00	19.80	19.25	19.00	18.70	18.00	18.20	19.10	19.25	19.75
1925	21.90	22.00	21.40	20.20	19.90	18.20	18.00	18.00	18.30	18.80	19.90	20.00
1924	21.40	22.00	21.70	21.70	20.70	20.00	19.00	19.00	19.00	19.00	19.25	20.50
1923	25.90	26.10	29.80	31.00	29.80	27.35	25.15	25.00	25.00	23.75	20.80	21.00
1922	18.30	17.95	17.95	20.20	24.65	25.00	25.00	27.40	32.90	30.50	28.10	25.20
1921	29.35	26.95	24.80	23.95	22.05	21.35	19.00	19.00	19.70	19.30	19.10	18.05
1920	38.20	42.25	43.00	43.00	43.25	43.65	45.75	48.50	48.50	45.25	34.90	33.00
1919	30.00	30.00	28.95	25.75	25.75	25.75	25.75	25.75	25.75	25.75	30.15	34.20
1918	33.00	33.00	33.00	32.00	32.00	32.00	32.00	32.00	32.00	33.00	33.00	33.00
1917	30.00	30.00	32.55	38.00	41.90	49.15	52.85	49.40	41.35	33.00	33.00	33.00
1916	17.85	18.00	18.25	18.00	18.15	18.00	18.00	18.00	18.65	20.30	27.25	30.00
1915	12.50	12.50	12.50	12.50	12.65	12.70	12.95	14.35	15.00	15.00	15.50	17.50
1914	12.35	13.05	13.05	13.00	13.00	13.00	13.00	13.00	13.00	12.85	12.50	12.50
1913	16.45	16.30	16.05	15.70	14.90	14.50	14.20	14.05	14.15	13.70	13.00	12.50
1912	12.40	12.25	12.75	13.00	13.00	13.20	13.50	14.00	15.15	16.20	16.20	16.45
1911	13.30	13.60	13.75	13.75	13.40	13.05	13.00	13.00	12.70	12.50	12.30	12.45
1910	16.90	16.30	16.00	15.95	15.05	14.70	14.50	14.00	13.85	13.15	13.35	13.45
1909	15.50	15.20	14.95	14.15	14.15	14.95	15.00	15.25	15.90	16.95	17.50	17.00
1908	17.10	17.00	16.00	16.00	14.85	15.25	14.50	14.60	14.25	14.25	14.95	15.50
1907	22.00	22.00	21.00	21.00	23.00	22.25	21.95	21.45	20.10	19.70	18.75	18.00
1906	17.00	16.70	17.00	17.15	17.25	17.50	17.25	17.75	18.40	19.30	21.00	23.00
1905	15.25	15.25	15.50	15.00	15.00	14.35	14.25	14.50	14.70	15.00	16.75	16.50
1904	12.85	12.50	12.90	13.10	12.50	11.65	11.35	11.75	11.65	12.05	13.95	19.65
1903	20.95	21.25	21.10	20.60	19.35	19.15	18.55	15.35	16.00	15.10	14.15	13.10
1902	19.75	16.15	16.50	17.50	15.75	20.65	20.60	20.60	20.65	20.70	20.90	20.90

No. 2 Foundry, f.o.b. Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec
1933	$15.50	$15.50	$15.50	$15.50	$15.90	$16.00	$16.75	$17.00	$17.50	$17.50	$17.50	$17.50
1932	16.50	16.50	16.50	16.00	15.60	16.00	15.50	15.50	15.50	15.50	15.50	15.50
1931	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.20	17.00	16.60
1930	20.00	20.00	19.50	19.40	19.00	18.40	17.90	17.50	17.50	17.50	17.50	17.50
1929	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
1928	18.50	18.50	18.50	18.50	18.20	18.00	17.60	17.60	18.25	18.80	20.00	20.00
1927	20.90	20.25	20.00	20.00	20.00	20.00	20.00	19.50	19.50	18.75	18.50	18.50
1926	23.00	23.00	23.00	22.00	21.65	21.10	21.00	21.00	21.00	21.00	21.00	21.00
1925	23.80	24.00	24.00	22.60	21.25	20.25	20.30	20.50	21.10	21.60	22.75	23.00
1924	23.70	24.40	24.50	24.40	22.80	21.40	19.80	20.40	20.50	20.50	21.00	22.00
1023	28.80	29.75	31.25	32.50	32.50	31.25	28.00	27.10	26.75	25.60	23.30	23.00
1922	19.00	18.90	20.00	20.50	22.60	23.25	24.65	28.60	32.00	31.75	30.60	28.00
1921	32.75	28.65	25.80	24.25	23.00	21.10	19.15	19.60	21.75	21.50	21.00	20.00
1920	40.00	42.25	43.00	43.00	43.00	43.00	44.40	46.00	46.00	46.00	42.40	36.50
1919	31.00	31.00	29.95	26.75	26.75	26.75	26.75	26.75	26.75	31.75	31.75	38.30
1918	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	34.00	34.00	34.00
1917	30.00	31.25	35.70	39.25	43.20	51.00	55.00	55.00	49.50	33.00	33.00	33.00
1916	18.50	18.50	18.70	19.00	19.00	19.00	19.00	19.00	18.65	19.15	25.00	29.25
1915	13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.40	13.80	14.45	17.10	18.00
1914	14.25	14.20	14.25	14.25	14.25	14.20	14.00	14.00	13.65	13.30	13.00	13.00
1913	18.00	18.00	17.60	17.25	16.70	16.10	15.20	15.00	15.00	15.00	15.00	14.50
1912	14.00	14.00	14.00	14.25	14.50	14.50	14.60	15.30	16.35	17.30	17.85	18.00
1911	15.00	15.00	15.00	15.00	15.00	15.00	15.00	14.50	14.50	14.50	14.00	14.00
1910	19.00	18.75	18.25	17.00	16.75	16.50	16.50	16.50	16.50	16.00	16.00	16.00
1909	17.45	16.75	16.50	16.45	16.20	16.40	16.90	17.35	18.20	18.85	19.00	19.00
1908	18.25	17.85	17.40	17.20	17.00	17.30	17.00	17.00	16.75	16.50	16.75	17.35
1907	26.00	26.50	26.75	27.50	27.40	26.50	25.40	24.50	23.60	22.60	20.60	19.00
1906	19.25	19.25	19.00	18.75	18.50	18.10	18.30	18.90	19.75	21.50	26.50	27.00
1905	17.50	17.50	17.50	17.50	17.25	16.60	16.15	16.35	16.50	17.55	18.90	19.50
1904	14.10	13.75	13.55	14.00	13.80	13.40	13.30	13.35	13.40	13.70	15.60	16.60
1903	25.00	24.00	24.00	23.00	21.70	20.50	18.50	17.50	16.85	15.90	14.50	14.30
1902	15.80	16.75	18.60	19.75	21.75	22.50	23.40	24.65	27.15	27.15	26.90	25.40
1901	14.60	14.10	15.20	15.50	15.50	15.50	15.50	15.20	15.00	15.00	15.00	15.50
1900	24.50	24.50	23.75	23.25	22.00	20.25	17.75	15.50	14.50	14.00	14.25	14.60
1899	11.25	12.00	14.25	15.00	15.25	17.00	17.00	20.00	22.00	23.00	23.50	24.50
1898	10.50	10.50	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1897	11.00	10.75	10.75	10.75	10.25	10.00	10.00	10.00	10.25	10.75	10.75	10.50
1896	13.50	12.25	12.00	12.00	11.75	11.25	11.25	11.20	10.80	10.75	11.10	11.25
1895	9.75	9.75	9.75	10.00	10.25	10.75	12.50	13.50	13.50	14.50	14.50	14.00

Market History—

Malleable, f.o.b. Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$15.50	$15.50	$15.50	$15.50	$15.90	$16.00	$16.50	$17.00	$17.50	$17.50	$17.50	$17.50
1932.....	16.50	16.50	16.50	16.00	15.60	16.00	15.50	15.50	15.50	15.50	15.50	15.50
1931.....	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.10	17.00	16.60
1930.....	20.00	20.00	19.50	19.40	19.00	18.40	17.90	17.50	17.50	17.50	17.50	17.00
1929.....	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
1928.....	18.50	18.50	18.50	18.50	18.20	18.00	17.60	17.60	18.25	18.80	20.00	20.00
1927.....	20.90	20.25	20.00	20.00	20.00	20.00	20.00	19.50	19.50	18.75	18.50	18.50
1926.....	23.00	23.00	23.00	22.00	21.65	21.10	21.00	21.00	21.00	21.00	21.00	21.00
1925.....	24.00	24.00	24.00	22.70	21.25	20.25	20.50	20.50	21.10	21.60	22.75	23.00
1924.....	23.70	24.40	24.50	24.40	22.80	21.40	19.80	20.40	20.50	20.50	21.00	22.00
1923.....	28.80	29.75	31.25	32.50	32.50	31.25	28.00	27.10	26.75	25.60	23.30	23.00
1922.....	19.00	18.90	20.00	20.50	22.60	23.25	24.65	28.60	32.00	31.75	30.60	28.25
1921.....	33.25	29.00	26.25	24.75	23.50	21.20	19.15	19.40	21.75	21.20	21.00	20.00
1920.....	40.50	42.75	43.50	43.50	43.50	43.50	44.90	46.50	46.60	46.50	43.00	37.50
1919.....	31.50	31.50	30.45	27.25	27.25	27.25	27.25	27.25	27.25	28.00	32.25	38.80
1918.....	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	34.50	34.50	34.50
1917.....	30.00	31.25	35.80	39.00	43.20	50.50	55.00	55.00	49.50	33.35	33.50	33.50
1916.....	19.00	19.00	19.00	19.50	19.50	19.50	19.50	19.50	19.15	19.50	25.00	29.25
1915.....	13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.40	14.20	15.10	17.40	18.00
1914.....	14.25	14.25	14.25	14.25	14.25	14.25	14.00	14.00	13.50	13.50	13.00	13.00
1913.....	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	14.40

No. 2X Foundry, delivered Philadelphia

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$13.76	$13.76	$13.76	$14.51	$15.91	$16.76	$17.28	$17.88	$18.63	$18.63	$18.63	$19.63
1932.....	15.76	15.76	15.76	15.66	15.13	14.76	14.76	14.51	14.26	14.16	13.95	13.88
1931.....	18.26	18.26	18.26	18.26	17.76	17.76	17.76	17.51	17.01	16.01	16.01	15.76
1930.....	21.56	21.26	20.76	20.76	20.26	20.26	20.26	19.76	19.76	19.26	19.13	18.26
1929.....	22.26	22.01	22.26	22.26	22.76	22.76	22.76	22.26	22.26	22.26	22.26	21.76
1928.....	20.51	20.91	21.26	21.26	21.26	21.26	20.76	20.76	21.01	21.76	21.51	21.76
1927.....	22.76	22.26	22.26	22.26	22.26	22.01	21.51	21.26	21.01	20.66	20.51	20.26
1926.....	24.26	24.01	23.26	23.26	23.01	22.76	22.26	22.01	22.26	22.51	23.51	23.76
1925.....	25.61	25.26	24.51	23.16	21.76	21.51	21.26	21.76	21.86	22.61	24.01	24.26
1924.....	24.26	24.26	24.13	23.73	22.60	21.76	21.76	21.76	21.26	21.36	22.98	24.88
1923.....	29.56	30.10	32.00	32.75	32.75	30.60	28.00	25.80	26.20	24.50	23.00	24.26
1922.....	21.55	21.35	23.60	23.75	25.60	27.20	27.90	32.15	34.25	33.00	30.50	28.45
1921.....	35.00	31.00	27.40	26.25	26.10	26.00	23.50	21.00	21.40	22.00	22.50	22.10
1920.....	43.90	45.00	45.68	46.80	46.90	46.90	48.55	50.95	53.75	52.65	46.75	38.95
1919.....	36.15	36.15	35.10	31.00	30.10	29.60	29.50	29.60	29.95	32.00	35.85	40.75
1918.....	34.25	34.25	34.25	34.25	34.25	34.25	34.50	34.50	34.50	38.85	39.15	39.15
1917.....	30.50	31.75	36.90	41.75	43.35	47.50	54.35	53.40	47.80	34.00	34.00	34.00
1916.....	19.75	20.00	20.00	20.75	20.50	19.75	19.75	19.75	19.75	20.50	25.25	30.00
1915.....	14.25	14.25	14.25	14.25	14.00	14.25	14.50	15.25	16.25	16.50	17.50	19.25
1914.....	14.75	15.00	15.00	15.00	14.75	14.75	14.75	14.75	14.75	14.50	14.25	14.25
1913.....	18.25	18.00	17.75	17.50	17.00	16.25	15.50	15.75	16.00	15.75	15.50	15.00
1912.....	15.00	15.00	15.00	15.25	15.25	15.50	15.75	16.00	16.50	17.50	18.00	18.25
1911.....	15.50	15.50	15.75	15.50	15.25	15.00	15.00	15.00	15.00	15.00	14.85	14.75
1910.....	19.00	18.40	18.25	17.75	17.25	16.75	16.00	16.00	16.00	15.75	15.50	15.50

Basic, delivered Eastern Pennsylvania

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$13.50	$13.50	$13.50	$14.19	$15.99	$18.19	$16.79	$17.20	$17.76	$17.76	$17.76	$18.76
1932.....	16.00	15.75	15.75	15.00	15.00	14.50	14.35	13.90	13.75	13.60	13.50	13.50
1931.....	17.25	17.25	17.25	17.25	17.00	17.00	16.75	16.75	16.00	16.00	16.00	16.00
1930.....	19.20	19.00	18.80	18.76	18.75	18.75	18.00	18.00	17.87	17.50	17.50	17.50
1929.....	20.15	20.50	20.25	20.25	20.50	20.25	19.85	19.85	19.85	19.75	19.75	19.75
1928.....	19.50	19.50	19.50	19.25	19.10	19.10	19.00	19.00	19.00	19.75	19.75	19.75
1927.....	21.25	21.00	21.00	20.90	20.75	20.75	20.50	19.75	19.75	19.50	19.50	19.25
1926.....	22.75	22.50	22.20	21.76	21.76	21.76	21.00	21.00	20.76	21.00	22.50	22.75
1925.....	24.25	24.20	24.05	22.65	21.45	21.50	21.50	20.55	20.50	20.50	22.70	23.00
1924.....	22.50	22.50	21.50	21.35	20.75	20.60	20.50	20.00	20.00	20.00	21.46	22.50
1923.....	27.70	28.15	29.35	30.75	30.75	28.15	27.25	25.10	25.10	24.00	22.60	23.30
1922.....	20.25	19.85	19.90	21.70	24.55	25.25	26.00	29.50	30.00	30.25	28.00	27.65
1921.....	33.35	29.95	26.20	25.00	25.00	24.70	22.25	20.70	19.50	20.50	20.90	20.25
1920.....	39.75	40.50	43.00	43.70	44.00	44.05	44.10	47.45	51.15	50.75	44.55	34.75
1919.....	33.90	33.90	32.85	29.65	28.80	25.50	26.60	27.00	27.00	27.90	33.00	35.75
1918.....	33.90	33.90	33.90	32.90	32.90	32.90	32.90	32.90	32.90	36.60	36.90	36.90
1917.....	30.15	30.50	33.80	38.25	40.80	46.40	50.75	51.00	46.50	33.50	33.50	33.50
1916.....	19.50	19.50	20.00	20.50	20.00	19.25	19.00	19.25	20.00	21.00	25.50	30.50
1915.....	13.50	13.75	14.00	13.25	13.50	13.50	13.75	15.25	17.25	17.50	17.75	18.00
1914.....	14.00	14.25	14.25	14.25	14.00	14.00	14.00	14.00	14.00	14.00	13.50	13.50
1913.....	18.25	18.00	17.50	16.50	16.50	16.00	15.25	15.00	15.25	15.25	15.00	14.25
1912.....	14.25	14.25	14.25	15.00	15.00	15.25	15.50	16.25	16.50	17.50	18.00	18.25
1911.....	14.50	15.00	15.25	15.25	14.75	14.50	14.50	14.50	14.50	14.50	14.25	14.25
1910.....	18.75	18.50	18.00	17.50	16.25	15.75	15.50	15.00	15.00	14.50	14.50	14.50
1909.....	16.40	16.10	15.85	15.05	15.00	15.85	15.90	16.15	16.80	17.85	18.36	18.15

No. 2X Foundry, f.o.b. Buffalo

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$16.50	$16.50	$16.50	$16.50	$16.50	$16.50	$17.10	$17.15	$17.50	$17.50	$17.50	$17.50
1932.....	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50
1931.....	18.00	18.00	18.00	18.00	17.60	17.50	17.50	17.50	17.50	17.50	17.50	17.50
1930.....	19.40	19.00	19.00	19.00	19.00	19.00	19.00	18.75	19.00	18.40	18.00	18.00
1929.....	19.00	19.00	19.25	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
1928.....	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	18.00	19.00	19.00
1927.....	19.75	18.90	18.15	18.00	18.00	17.90	17.50	17.45	18.00	18.00	17.60	17.50
1926.....	21.50	21.50	21.50	21.50	21.25	20.50	19.80	20.00	20.00	20.00	20.00	20.00
1925.....	23.50	22.75	22.50	20.90	19.25	19.00	19.00	19.00	19.00	19.50	21.25	21.50
1924.....	23.10	22.75	22.00	21.50	20.50	19.90	19.30	19.10	19.50	19.60	20.90	22.00
1923.....	28.00	28.50	29.40	30.10	29.80	29.50	26.60	25.50	25.25	23.00	20.70	22.00
1922.....	19.80	19.15	18.30	20.75	23.00	23.85	25.35	31.50	33.75	31.50	27.85	26.00
1921.....	33.75	31.25	28.25	26.75	26.25	23.85	21.75	21.25	21.05	20.40	20.00	20.00
1920.....	41.50	44.60	45.15	46.25	46.25	46.25	46.25	48.75	51.25	51.25	46.00	48.25
1919.....	32.25	32.25	31.45	28.00	28.00	28.00	28.00	28.70	28.75	29.90	34.45	39.50
1918.....	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	35.25	35.25	35.25
1917.....	35.00	35.00	38.15	40.00	42.75	49.15	53.50	54.00	49.05	33.50	33.50	33.50
1916.....	18.50	18.60	18.85	19.15	19.00	18.75	18.75	18.75	18.90	20.70	26.65	33.65
1915.....	13.15	13.05	12.55	12.75	12.75	12.75	12.80	13.70	15.15	15.80	16.70	18.00
1914.....	13.00	13.00	13.75	13.90	13.50	13.05	13.05	13.20	13.25	12.60	12.45	13.10
1913.....	17.25	17.00	17.00	16.50	15.50	14.75	14.00	14.00	14.25	14.00	14.00	14.00

Market History—

No. 2 Foundry, f.o.b. Valley

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933	$14.50	$14.50	$14.50	$14.50	$14.75	$15.50	$15.50	$15.50	$16.50	$16.50	$16.50	$16.50
1932	15.50	15.50	15.00	15.00	14.80	14.50	14.50	14.50	14.50	14.50	14.50	14.50
1931	17.00	16.75	16.90	17.00	17.00	17.00	17.00	17.00	17.00	16.85	16.00	15.50
1930	18.50	18.50	18.50	18.50	18.50	17.63	18.00	18.00	17.75	17.20	17.00	17.00
1929	17.50	17.50	17.75	18.15	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50
1928	17.25	17.25	17.25	17.25	17.10	16.75	16.50	16.50	16.85	17.00	17.70	18.00
1927	18.43	18.06	18.37	18.50	18.50	18.20	17.50	17.50	17.50	17.50	17.45	17.25
1926	20.50	20.50	20.50	19.30	19.00	18.00	17.80	17.50	17.70	18.35	19.60	19.00
1925	22.25	22.00	21.25	20.20	18.85	18.50	18.50	18.75	19.20	20.40	00.00	20.50
1924	22.40	23.00	22.50	21.75	20.90	19.50	19.00	19.25	19.50	19.50	19.60	20.50
1923	27.00	27.00	29.60	31.00	30.15	27.75	25.60	24.70	24.75	23.40	22.00	22.00
1922	20.05	19.20	19.20	20.55	23.95	24.20	24.20	31.00	35.25	31.85	28.40	25.00
1921	31.10	28.20	26.20	25.05	23.80	22.50	20.30	20.10	21.20	21.20	20.05	20.35
1920	40.90	42.40	43.40	44.20	45.40	45.40	46.40	49.65	50.95	48.95	42.95	37.20
1919	31.00	31.00	29.10	26.75	26.75	28.15	28.15	28.15	29.50	34.95	33.35	38.15
1918	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	34.00	34.00	34.00
1917	32.35	34.25	37.20	39.99	42.95	51.40	55.90	54.70	49.05	33.00	33.00	33.00
1916	18.90	18.75	18.75	18.90	18.70	18.50	18.50	18.50	18.65	20.75	26.10	31.30
1915	13.25	13.25	13.25	12.95	12.75	12.75	12.85	13.95	14.75	14.85	15.90	17.50
1914	12.89	13.25	13.40	13.50	13.50	13.50	13.50	13.30	13.25	13.10	12.90	13.05
1913	17.50	17.30	16.75	15.80	14.80	14.15	13.85	13.80	14.00	13.90	13.90	13.50
1912	13.00	13.10	13.20	13.35	13.30	13.30	13.50	13.85	14.50	16.15	17.30	17.50
1911	18.75	13.75	13.85	13.85	14.75	13.60	13.50	13.50	13.50	13.50	13.15	12.80
1910	17.00	16.55	16.10	15.75	15.35	14.65	14.20	14.10	14.40	13.95	13.75	13.75
1909	15.35	15.00	14.85	14.25	14.35	14.85	15.25	15.35	16.25	17.10	17.25	17.25
1908	16.35	16.00	15.70	15.10	14.50	15.35	15.10	15.00	14.60	14.20	15.50	15.50
1907	23.30	24.00	24.00	24.00	24.50	24.50	23.15	22.55	21.30	20.05	19.15	17.05
1906	17.55	17.25	17.15	16.75	16.65	16.25	16.50	18.00	19.00	20.50	23.00	23.75
1905	16.50	16.15	16.00	16.15	15.75	14.35	14.35	14.55	14.75	15.65	16.85	17.25
1904	12.50	12.25	13.00	12.90	12.15	11.65	11.50	11.65	11.75	12.40	15.00	16.00

Southern No. 2, f.o.b. Birmingham

(Local delivery)

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933	$11.00	$11.00	$11.00	$11.40	$12.00	$12.00	$12.60	$13.00	$13.50	$13.50	$13.50	$13.50
1932	12.00	11.20	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1931	14.00	13.00	13.00	13.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
1930	14.70	15.00	14.50	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
1929	16.50	16.50	16.00	15.50	15.50	15.25	14.00	14.00	14.00	14.00	14.00	14.00
1928	16.00	16.00	16.00	16.00	16.00	15.90	15.50	15.65	16.25	16.25	16.30	16.50
1927	18.50	18.00	18.00	18.00	18.00	18.00	17.43	17.25	17.25	17.25	16.00	16.00
1926	22.75	22.00	22.00	22.00	22.00	21.00	21.00	21.00	20.80	20.00	20.00	20.00
1925	20.10	20.75	21.00	20.00	20.00	19.00	18.00	18.00	18.50	19.50	21.00	21.20
1924	21.60	23.00	23.00	22.20	21.60	20.00	18.20	17.90	17.65	17.50	17.90	19.50
1923	23.30	24.50	26.50	27.00	27.00	26.75	25.00	23.60	22.75	20.20	19.25	21.00
1922	16.15	19.25	15.25	16.00	17.60	18.50	18.50	20.70	26.25	27.40	24.00	22.50
1921	33.75	27.70	25.10	23.00	22.50	21.70	20.25	19.00	19.00	19.00	18.25	17.00
1920	38.20	40.00	40.00	40.00	42.00	42.30	42.30	42.00	42.00	42.00	39.50	38.00
1919	31.00	31.00	30.00	26.75	26.25	25.25	25.00	26.75	26.75	27.45	30.65	35.15
1918	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	35.25	35.25	35.25
1917	23.00	24.50	28.00	35.80	35.75	35.75	46.00	48.00	43.50	33.50	33.50	33.50
1916	14.50	14.65	15.00	15.00	15.00	14.45	14.00	13.60	14.40	15.15	19.60	23.00
1915	9.50	9.50	9.40	9.35	9.75	9.55	9.60	11.00	11.30	11.75	13.15	14.20
1914	10.50	10.50	10.60	10.50	10.50	10.45	10.05	10.00	10.00	10.00	9.90	9.50
1913	13.70	13.50	13.00	12.50	11.75	10.60	10.50	11.00	11.00	11.00	10.75	11.00
1912	10.00	10.00	10.05	10.50	10.95	11.00	11.25	11.65	12.50	13.45	13.75	13.50
1911	11.00	11.00	11.00	11.00	10.75	10.25	10.00	10.05	10.10	10.00	9.75	10.00
1910	14.00	13.90	13.00	12.10	11.80	11.60	11.40	11.00	11.00	11.00	11.00	11.00
1909	13.00	12.70	11.75	11.00	11.00	11.30	12.30	13.00	14.00	14.50	14.50	14.00
1908	12.80	12.50	12.10	11.90	11.50	12.00	11.60	12.05	12.50	12.50	12.50	13.00
1907	23.00	23.00	22.75	22.00	21.40	21.25	20.50	19.80	18.10	17.65	16.00	14.90
1906	14.00	14.00	13.70	13.65	13.75	13.50	13.00	14.15	16.00	17.15	21.25	22.00
1905	13.50	13.50	13.50	13.25	12.75	11.85	11.00	11.65	11.75	12.50	14.00	14.00
1904	9.75	9.50	9.70	10.00	9.65	9.15	9.15	9.50	9.50	10.65	12.75	13.05

Lake Superior Charcoal, delivered Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933	$23.04	$23.04	$23.04	$23.04	$23.04	$23.04	$23.04	$23.04	$23.54	$23.54	$23.54	$23.54
1932	22.29	23.04	23.04	23.04	23.04	23.04	23.04	23.04	23.04	23.04	23.04	23.04
1931	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	25.54	25.04	25.04	20.79
1930	27.04	27.04	27.04	27.04	27.04	24.04	27.04	27.04	27.04	27.04	27.04	27.04
1929	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04
1928	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04
1927	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04
1926	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	27.04	27.04	27.04
1925	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04
1924	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04
1923	33.15	33.53	35.53	36.55	36.55	36.65	36.62	32.10	32.04	30.04	28.65	29.04
1922	31.50	30.50	26.90	26.50	28.40	30.00	31.65	33.75	36.15	36.15	36.15	36.15
1921	40.25	38.50	38.50	38.50	38.50	38.50	36.87	34.30	33.25	32.50	32.25	31.50
1920	48.75	55.65	57.50	57.50	57.50	57.50	57.50	57.60	58.30	58.50	58.50	53.50
1919	38.70	38.70	38.70	33.25	31.75	31.75	31.75	32.75	32.75	33.15	35.50	41.00
1918	37.50	37.50	37.50	37.50	37.50	37.50	37.70	37.70	37.70	37.70	38.70	38.70
1917	33.75	34.50	37.55	42.25	49.25	51.80	59.50	59.50	59.50	48.50	37.50	37.50
1916	19.25	19.50	19.75	19.75	19.75	19.75	19.75	19.75	19.75	20.35	21.95	31.75
1915	15.75	15.75	15.75	15.75	15.25	15.25	15.75	15.75	15.95	16.25	17.50	19.25
1914	15.50	15.50	15.50	15.50	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75
1913	18.25	18.00	18.00	18.00	18.00	16.75	16.75	15.00	15.00	15.75	15.50	15.50
1912	16.50	16.50	16.50	15.50	15.75	15.75	16.25	16.75	17.75	18.75	18.75	18.75
1911	17.50	17.50	17.50	17.50	17.00	17.00	17.00	17.00	17.00	17.00	16.50	16.50
1910	19.50	19.50	19.00	19.00	19.00	18.50	18.50	18.50	18.50	18.00	18.00	17.50
1909	19.50	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70
1908	22.80	21.50	21.50	21.10	19.85	19.50	19.50	19.50	19.50	19.50	19.50	19.50
1907	25.50	26.75	25.50	26.00	27.10	27.40	27.10	27.00	26.75	26.10	25.25	23.50

Market History—

Standard Low Phosphorus, del. Eastern Pennsylvania

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$20.75	$20.50	$20.50	$20.50	$21.68	$22.00	$22.80	$23.50	$23.13	$23.13	$23.13	$24.13
1932.....	23.76	23.76	23.76	23.76	23.76	23.76	23.76	23.76	23.76	23.76	23.76	23.76
1931.....	24.76	24.76	24.76	24.76	24.76	23.76	23.76	23.76	23.76	23.76	23.76	23.76
1930.....	24.76	24.76	24.76	24.76	24.76	24.26	24.26	24.26	24.76	24.76	24.76	24.76
1929.....	24.26	24.26	24.26	24.26	24.26	24.26	24.26	24.26	24.76	24.76	24.76	24.76
1928.....	24.76	24.76	24.76	24.76	24.76	24.51	24.51	24.51	24.26	24.26	24.26	24.26
1927.....	25.76	25.76	25.76	25.76	25.76	25.76	25.76	25.26	25.26	25.26	24.76	24.76
1926.....	24.76	24.76	24.76	24.76	24.76	24.26	24.26	24.26	24.51	24.76	25.76	25.76
1925.....	26.76	26.76	26.76	26.26	25.26	25.26	25.26	25.26	24.01	24.51	24.76	24.76
1924.....	27.76	27.76	26.76	27.86	27.26	27.26	27.26	26.26	26.26	26.26	26.76	29.79
1923.....	29.75	31.35	35.45	35.45	35.80	34.80	33.80	32.80	30.50	30.50	30.00	29.76
1922.....	35.00	34.00	34.00	34.00	35.35	35.35	35.15	38.00	40.00	40.00	40.00	40.00
1921.....	47.70	46.80	46.80	44.15	43.30	43.30	43.30	43.30	43.30	43.30	43.30	35.30
1920.....	51.60	53.55	53.80	53.80	54.80	60.20	57.80	59.60	65.30	65.30	*65.30	*65.30
1919.....	51.00	51.00	49.90	46.75	45.80	42.25	41.10	40.25	40.25	40.35	43.00	47.50
1918.....	55.50	55.50	55.50	55.50	55.50	55.50	56.00	56.00	56.00	57.00	57.00	57.00
1917.....	54.50	57.50	66.70	75.50	77.00	85.00	92.50	92.50	82.00	55.50	55.50	55.50
1916.....	32.00	32.00	32.00	33.00	34.00	34.00	33.00	33.00	34.00	40.00	46.00	55.00
1915.....	19.00	19.00	20.00	20.00	20.00	20.50	21.50	23.50	24.50	28.00	30.00	32.00
1914.....	21.00	21.00	21.00	21.00	21.00	20.50	20.50	21.00	21.00	21.00	19.00	19.00
1913.....	24.50	24.50	24.00	23.50	23.50	23.50	23.50	23.00	23.00	23.00	21.50	21.00
1912.....	19.25	19.00	19.00	19.50	19.75	19.75	20.00	21.00	21.50	22.50	24.00	24.50
1911.....	21.50	21.00	21.00	21.00	21.00	20.50	20.50	20.50	20.50	20.25	19.50	19.25

*Nominal.

No. 2X, f.o.b. Virginia Furnace

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$17.75	$17.75	$17.75	$17.75	$17.75	$17.75	$17.75		Not offered after July			
1932.....	18.00	18.00	18.00	18.00	18.00	18.00	18.00	17.75	17.75	17.75	17.75	17.75
1931.....	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.00	18.00	18.00
1930.....	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25
1929.....	21.25	21.25	21.00	20.75	20.75	20.00	20.00	20.00	20.00	19.65	18.25	18.25
1928.....	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	21.25
1927.....	21.75	22.00	22.00	22.00	22.00	22.00	22.00	21.50	21.50	21.50	21.25	21.00
1926.....	23.50	23.25	23.25	23.25	23.00	23.00	22.75	22.75	23.00	22.50	22.75	23.00
1925.....	24.50	24.50	24.50	23.90	23.35	23.00	23.00	23.00	23.00	23.00	23.00	23.30
1924.....	25.00	25.75	26.00	25.50	25.50	25.50	24.50	24.50	24.50	24.50	24.50	25.00
1923.....	27.50	27.50	28.25	29.25	28.60	28.00	27.25	26.25	25.50	25.00	25.00	24.50
1922.....	21.75	22.00	22.50	22.85	23.50	24.50	26.00	26.00	33.00	33.00	31.40	27.75
1921.....	34.50	31.25	28.05	27.10	27.00	26.00	24.50	24.00	23.00	23.25	22.80	22.50
1920.....	41.25	42.75	43.25	44.25	45.75	46.25	46.75	49.25	50.25	49.75	45.75	42.05
1919.....	35.25	33.00	31.55	28.45	27.50	26.50	26.50	28.25	29.25	30.35	33.40	38.25
1918.....	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	37.50	38.00	38.00
1917.....	26.50	28.25	34.25	38.30	41.00	46.50	52.25	51.90	46.50	33.50	33.50	33.50
1916.....	17.25	18.00	18.25	18.50	18.50	18.50	18.50	18.50	17.50	18.50	23.75	27.00
1915.....	12.50	12.50	12.50	12.50	12.50	12.50	12.50	13.00	13.50	14.00	15.50	17.00
1914.....	12.75	12.75	12.75	12.75	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50
1913.....	16.00	15.50	15.50	15.00	14.50	13.75	13.00	13.00	13.00	13.00	13.00	12.75
1912.....	12.25	12.25	12.25	13.00	13.00	13.25	13.50	14.00	14.50	15.50	16.00	16.00
1911.....	12.75	12.75	13.00	13.00	13.00	12.25	12.25	12.25	12.25	12.25	12.25	12.25

Semifinished Material

Per Gross Ton f.o.b.

Open-Hearth Sheet Bars, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00
1932.....	27.50	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
1931.....	30.00	30.00	30.00	30.00	29.75	29.00	29.00	29.00	29.00	29.00	29.00	28.50
1930.....	33.80	33.00	33.00	33.00	32.20	31.25	31.00	31.00	31.00	31.00	31.00	30.50
1929.....	34.00	33.25	35.00	35.25	36.00	35.75	35.00	35.00	35.00	35.00	35.00	34.75
1928.....	34.00	34.00	33.70	34.00	34.00	33.50	32.25	32.20	33.00	33.00	33.60	34.00
1927.....	36.00	35.00	34.00	33.75	33.75	33.50	33.50	33.50	33.90	34.00	34.00	34.00
1926.....	36.50	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00
1925.....	39.25	39.00	38.25	37.00	36.25	35.00	35.00	35.00	35.00	35.00	35.00	36.80
1924.....	42.50	42.50	42.50	42.10	40.60	40.00	39.20	38.00	37.50	37.20	37.00	37.00
1923.....	37.50	39.25	44.50	45.85	45.40	42.90	42.50	42.50	42.50	42.50	42.50	42.50
1922.....	30.00	29.00	29.40	31.50	35.00	35.00	35.00	35.00	39.50	39.85	38.80	36.50
1921.....	47.00	43.00	39.60	38.75	39.00	37.40	34.00	32.00	30.40	31.50	30.00	29.25
1920.....	53.40	65.00	72.50	78.00	78.75	75.00	75.00	71.25	68.50	63.75	56.25	47.65
1919.....	47.00	47.00	45.75	42.00	42.00	41.50	40.80	42.00	42.00	42.00	45.00	48.00
1918.....	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00
1917.....	60.00	62.50	67.50	72.00	88.00	101.25	105.00	96.00	82.50	65.50	57.00	51.00
1916.....	34.75	35.00	41.00	45.00	44.25	41.20	40.00	43.60	45.00	45.75	52.00	59.00
1915.....	20.00	20.00	20.00	19.60	20.00	20.35	22.00	25.00	25.80	26.50	28.50	30.80
1914.....	20.60	21.75	22.00	21.60	21.00	20.75	20.20	21.00	22.00	21.60	19.60	19.00
1913.....	29.20	29.90	30.00	30.00	28.80	27.50	27.50	27.10	25.60	23.80	21.75	21.00

Bessemer Sheet Bars, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00
1932.....	27.50	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
1931.....	30.00	30.00	30.00	30.00	29.75	29.00	29.00	29.00	29.00	29.00	29.00	28.50
1930.....	33.80	33.00	33.00	33.00	32.20	31.25	31.00	31.00	31.00	31.00	31.00	30.50
1929.....	34.00	33.25	35.00	35.25	36.00	35.75	35.00	35.00	35.00	35.00	35.00	34.75
1928.....	34.00	34.00	33.70	34.00	34.00	33.50	32.25	32.20	33.00	33.00	33.60	34.00
1927.....	36.00	35.00	34.00	33.75	33.75	33.50	33.50	33.50	33.90	34.00	34.00	34.00
1926.....	36.50	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00
1925.....	39.20	39.00	38.50	37.00	36.25	35.00	35.00	35.00	35.00	35.00	35.00	36.80
1924.....	42.50	42.50	42.50	42.10	40.60	40.00	39.20	38.00	37.50	37.20	37.00	37.00
1923.....	37.50	39.25	44.50	45.85	45.40	42.90	42.50	42.50	42.50	42.50	42.50	42.50
1922.....	30.00	29.00	29.40	31.50	35.00	35.00	35.00	35.00	39.50	39.85	38.80	36.50
1921.....	47.00	43.00	39.60	38.75	39.00	37.40	34.00	32.00	30.40	31.50	30.00	29.25
1920.....	53.40	65.00	70.00	70.00	75.00	70.00	70.00	70.00	68.50	63.75	56.25	47.65
1919.....	47.00	47.00	45.75	42.00	42.00	41.50	40.80	42.00	42.00	42.00	45.00	48.00
1918.....	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00
1917.....	60.00	62.50	67.50	72.00	88.00	101.25	105.00	96.00	82.50	65.50	57.00	57.00
1916.....	33.75	34.00	41.00	45.00	44.25	41.20	40.00	43.60	45.00	45.75	52.00	59.00
1915.....	20.00	20.00	20.00	19.60	20.00	20.35	22.00	25.00	25.80	26.50	28.50	30.80
1914.....	21.00	22.00	22.00	21.60	21.00	20.75	20.20	21.00	22.00	21.60	19.60	19.00
1913.....	28.70	29.40	29.50	29.50	28.40	27.50	27.50	27.10	25.60	23.80	21.75	21.00

Market History—

Open-Hearth Billets, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00
1932.....	27.50	27.00	27.00	27.00	27.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
1931.....	30.00	30.00	30.00	30.00	30.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00
1930.....	33.80	33.00	33.00	33.00	32.20	31.25	31.00	31.00	31.00	31.00	31.00	30.50
1929.....	33.00	34.25	34.00	34.50	36.00	35.75	35.00	35.00	35.00	35.00	35.00	34.75
1928.....	33.00	33.00	33.00	33.00	33.00	32.50	32.25	32.00	32.00	32.75	33.00	33.00
1927.....	35.00	34.00	33.60	33.50	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00
1926.....	35.50	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
1925.....	37.75	37.65	37.75	35.80	35.40	33.90	35.00	35.00	35.00	35.00	35.00	35.00
1924.....	40.00	40.00	40.00	40.00	39.20	38.00	38.00	38.00	37.10	36.60	35.50	35.50
1923.....	37.50	38.85	44.50	46.00	45.00	42.90	42.50	42.50	42.50	41.50	41.50	40.00
1922.....	29.00	28.00	28.30	30.10	34.50	35.00	35.00	35.00	39.50	40.00	38.80	36.50
1921.....	43.50	41.00	38.50	37.75	37.00	37.00	32.25	30.00	29.80	30.00	29.00	29.00
1920.....	49.60	61.25	66.25	70.00	70.00	66.25	65.00	61.25	60.00	58.75	52.50	46.25
1919.....	43.50	43.50	42.25	38.50	38.50	38.00	37.30	38.00	38.50	39.30	40.85	45.00
1918.....	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50
1917.....	60.00	62.50	67.00	72.50	85.00	93.75	100.00	93.00	73.75	58.75	47.50	47.50
1916.....	34.75	35.00	40.60	45.00	44.25	41.20	40.00	43.60	45.00	45.75	52.00	58.75
1915.....	19.50	19.50	19.50	19.50	19.50	19.85	21.50	24.00	25.60	26.50	28.00	30.20
1914.....	20.00	20.75	21.00	20.80	20.00	19.75	19.30	20.00	21.00	20.60	19.00	18.50
1913.....	28.70	29.40	29.50	29.50	28.10	26.50	26.50	26.10	25.00	23.00	20.85	20.00
1912.....	19.75	19.50	19.40	20.25	21.00	21.25	21.75	21.75	21.75	21.75	21.75	28.00
1911.....	23.00	23.00	23.00	23.00	22.00	21.00	21.00	21.00	20.25	19.50	19.75	19.25
1910.....	28.00	28.00	28.50	28.75	28.75	27.00	26.50	26.00	25.00	24.00	23.25	23.00

Bessemer Billets, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00	$26.00
1932.....	27.50	27.00	27.00	27.00	27.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
1931.....	30.00	30.00	30.00	30.00	30.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00
1930.....	33.80	33.00	33.00	33.00	32.20	31.25	31.00	31.00	31.00	31.00	31.00	30.50
1929.....	33.00	34.25	34.00	34.50	36.00	35.75	35.00	35.00	35.00	35.00	35.00	34.75
1928.....	33.00	33.00	33.00	33.00	33.00	32.50	32.25	32.00	32.00	32.75	33.00	33.00
1927.....	35.00	34.00	33.60	33.50	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00
1926.....	35.50	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
1925.....	37.40	37.60	37.75	35.80	35.35	35.00	35.00	35.00	35.00	35.00	35.00	35.00
1924.....	40.00	40.00	40.00	40.00	39.20	38.00	38.00	38.00	37.10	36.60	35.50	35.50
1923.....	37.50	38.85	44.50	46.00	45.00	42.90	42.50	42.50	42.50	41.50	41.50	40.00
1922.....	29.00	28.00	28.30	30.10	34.50	35.00	35.00	35.00	39.50	40.00	38.80	36.50
1921.....	43.50	41.00	38.50	37.75	37.00	37.00	32.25	30.00	29.80	30.00	39.00	29.00
1920.....	49.60	61.25	65.00	68.00	70.00	66.25	65.00	61.25	60.00	58.75	52.50	46.25
1919.....	43.50	43.50	42.25	38.50	38.50	38.00	37.30	38.00	38.50	39.30	40.85	45.00
1918.....	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50
1917.....	62.50	64.85	69.30	75.20	88.65	95.60	102.25	92.25	74.05	58.75	47.50	47.50
1916.....	34.05	35.50	41.10	46.25	46.10	43.00	42.50	45.15	47.50	48.10	53.10	59.50
1915.....	19.75	20.00	20.00	20.00	20.05	20.35	21.45	23.00	24.70	25.20	27.10	30.75
1914.....	20.00	20.90	21.05	21.05	20.00	19.80	19.55	20.05	21.00	20.40	19.25	18.85
1913.....	28.90	28.90	29.00	29.00	27.80	26.75	26.75	26.30	25.00	23.00	21.10	20.10
1912.....	20.00	20.00	19.90	20.00	21.10	21.90	22.25	22.40	23.75	25.70	26.75	27.00
1911.....	23.00	23.00	23.00	23.00	23.00	21.00	21.00	21.00	21.00	20.00	19.70	19.25
1910.....	27.87	27.50	27.50	27.00	26.10	25.50	25.00	25.00	24.50	23.40	23.00	23.00
1909.....	25.00	23.50	23.00	22.00	22.50	23.00	24.00	25.00	26.00	26.50	27.50	27.50
1908.....	28.00	28.00	28.00	28.00	28.00	26.50	25.00	25.00	25.00	25.00	25.00	25.00
1907.....	29.75	29.50	29.25	29.75	30.25	31.00	30.00	30.00	29.50	28.50	28.00	28.00
1906.....	27.00	27.50	27.65	27.75	27.00	26.25	27.00	28.00	28.50	28.50	29.00	29.75
1905.....	21.00	24.90	24.60	25.50	23.50	22.00	22.00	23.50	25.75	25.95	26.30	26.50
1904.....	23.00	23.00	23.00	23.00	22.00	21.50	21.00	20.00	19.50	19.50	21.00	21.00
1903.....	29.75	30.00	30.25	31.00	30.50	29.50	27.50	27.00	27.00	26.50	23.50	23.00
1902.....	28.05	29.80	31.35	32.25	33.90	35.20	33.50	32.10	31.50	29.80	29.00	29.25
1901.....	19.70	19.75	20.80	24.10	24.20	24.45	24.25	24.40	24.10	26.80	28.25	27.60
1900.....	35.00	35.00	35.00	34.50	29.00	27.25	22.50	18.00	17.50	17.50	19.30	19.75
1899.....	16.75	18.25	24.00	25.50	27.00	31.50	33.50	36.50	39.00	37.50	36.00	35.00
1898.....	15.00	15.00	15.25	15.25	14.85	14.75	14.75	15.45	16.10	15.75	15.25	16.00
1897.....	15.25	15.50	15.50	14.75	14.00	14.25	14.00	14.15	15.75	16.50	15.75	15.00
1896.....	17.05	17.65	17.50	18.90	19.50	19.75	19.90	91.75	19.60	20.25	20.00	17.00
1895.....	14.85	15.00	14.85	15.40	16.75	18.75	20.85	22.00	24.25	22.00	19.50	17.00

Wire Rods, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$36.20	$35.00	$35.00	$35.00	$35.00	$35.00	$35.00	$35.00	$35.00	$35.00	$35.00	$36.00
1932.....	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00
1931.....	35.00	35.00	36.00	36.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
1930.....	40.00	40.00	38.00	38.00	36.40	36.00	36.00	36.00	36.00	36.00	36.00	35.50
1929.....	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	40.00	40.00
1928.....	41.50	43.50	44.00	44.00	44.00	44.00	42.00	42.00	42.00	42.00	42.00	42.00
1927.....	45.00	43.50	43.00	42.50	42.00	42.00	43.00	43.00	43.00	42.50	41.00	40.00
1926.....	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
1925.....	48.00	48.00	48.00	47.75	46.00	45.25	45.00	45.00	45.00	45.00	45.00	45.30
1924.....	51.00	51.00	51.00	51.00	48.40	48.00	48.00	46.00	45.75	45.00	45.50	48.00
1923.....	45.00	47.50	47.00	46.60	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00
1922.....	37.00	35.75	35.80	38.00	38.00	38.00	39.50	40.00	45.00	45.00	46.50	46.50
1921.....	57.00	57.00	52.00	50.00	48.00	47.00	42.25	42.00	40.80	40.00	38.00	38.00
1920.....	52.00	56.00	62.50	70.00	70.00	70.00	70.00	70.00	70.00	75.00	72.50	57.00
1919.....	57.00	57.00	55.75	52.00	52.00	52.00	52.00	52.00	52.00	52.00	56.00	62.00
1918.....	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.25	57.50	57.50	57.50
1917.....	73.75	75.00	75.00	83.75	88.00	92.50	95.00	96.00	90.00	73.50	57.00	57.00
1916.....	46.25	50.00	51.00	55.00	60.00	60.00	58.75	55.00	55.00	55.00	64.00	69.00
1915.....	25.00	25.00	25.00	25.00	25.00	25.00	25.60	26.75	28.50	30.00	34.50	39.00
1914.....	25.50	25.90	26.00	26.00	26.00	25.50	24.80	24.50	25.60	26.00	25.75	25.05
1913.....	30.00	30.00	30.00	30.00	30.00	29.50	28.60	27.60	27.50	26.80	26.00	25.70
1912.....	24.65	25.30	25.50	25.50	25.90	25.35	25.65	26.00	26.25	27.80	29.60	30.00

By-Product Foundry Coke

Per Net Ton

Birmingham, Ovens

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.40	$4.50	$4.75	$4.85	$4.85
1932.....	4.50	4.50	4.50	4.50	4.50	4.50	4.25	4.50	4.50	4.50	4.15	4.00
1931.....	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.75
1930.....	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
1929.....	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
1928.....	5.00	5.00	5.00	3.95	4.80	5.00	5.00	5.00	5.00	5.00	5.00	5.00
1927.....	5.15	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.25	5.00
1926.....	5.60	5.50	5.50	5.15	5.15	5.50	5.50	5.50	5.50	5.50	5.50	5.50
1925.....	.....	4.90	5.00	5.00	4.65	4.50	4.50	4.50	4.60	4.75	5.70	5.70

Market History—

Chicago, ovens

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$7.00	$7.00	$7.00	$7.00	$7.00	$7.15	$7.50	$7.50	$8.00	$8.00	$8.00	$8.00
1932.....	7.50	7.50	7.50	7.50	7.30	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1931.....	8.00	8.00	8.00	8.00	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50
1930.....	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
1929.....	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
1928.....	9.00	9.00	9.00	9.00	9.00	8.50	8.00	8.00	8.00	8.00	8.00	8.00
1927.....	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.30	9.00
1926.....	10.50	10.50	10.50	9.95	9.75	9.75	9.75	9.75	9.75	9.75	9.75	10.25
1925.....	10.75	10.75	10.75	10.75	10.75	10.75	9.75	9.75	9.75	10.25	10.45	10.50
1924.....	12.50	12.50	12.50	12.50	12.50	12.50	11.45	10.75	10.75	10.75	10.75	10.75
1923.....	15.00	15.00	15.00	15.00	15.00	15.00	13.50	13.50	13.50	13.50	12.50	12.50
1922.....	11.25	11.25	11.25	11.25	11.25	11.25	11.25	12.60	13.50	13.50	14.70	15.00
1921.....	.....	.....	.....	.....	.....	.....	11.25	11.25	11.25	11.25	11.25	11.25

Newark, delivered

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$8.21	$8.21	$8.21	$8.21	$8.21	$8.21	$8.21	$8.21	$8.51	$8.71	$8.71	$8.71
1932.....	8.76	8.76	8.76	8.76	8.23	8.21	8.21	8.21	8.21	8.21	8.21	8.21
1931.....	9.00	9.00	9.00	9.00	9.00	8.70	8.70	8.70	8.70	8.70	8.70	8.70
1930.....	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
1929.....	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
1928.....	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
1927.....	9.84	9.59	9.59	9.59	9.59	9.59	9.59	9.59	9.59	9.59	9.59	9.59
1926.....	11.01	11.01	11.01	9.59	9.59	9.59	9.59	9.59	9.59	9.59	10.59	10.59
1925.....	10.41	10.41	10.41	10.41	10.41	10.41	10.41	10.41	10.41	10.71	11.04	11.52
1924.....	10.91	10.91	10.91	10.81	10.41	10.41	10.41	10.41	10.41	10.41	10.41	10.41
1923.....	12.84	12.84	12.84	12.84	12.34	11.84	11.34	11.34	11.34	11.41	10.91	10.91
1922.....	8.59	8.59	8.59	8.84	9.49	10.34	11.47	14.04	14.84	14.84	13.28	12.84
1921.....	.....	.....	.....	.....	.....	.....	8.84	8.84	8.84	8.84	8.84	8.84

St. Louis, delivered

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$7.75	$7.75	$7.75	$7.75	$7.75	$7.75	$7.75	$7.75	$8.15	$8.50	$8.75	$9.00
1932.....	8.50	8.50	8.50	8.50	8.50	7.95	7.75	7.75	7.75	7.75	7.75	7.75
1931.....	9.00	9.00	9.00	9.00	9.00	8.60	8.50	8.50	8.50	8.50	8.50	8.50
1930.....	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
1929.....	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
1928.....	9.75	9.75	9.75	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
1927.....	10.50	10.50	10.50	*9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75
1926.....	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.25	10.50
1925.....	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.15	9.50	9.80	10.00	10.00
1924.....	12.50	12.50	12.50	12.00	12.00	10.60	9.20	9.00	9.00	9.00	9.00	9.00
1923.....	14.00	14.25	14.20	14.00	14.00	14.00	14.00	13.00	13.00	13.00	13.00	13.00
1922.....	9.50	9.50	9.30	9.00	9.00	9.00	9.00	11.40	13.00	14.00	14.00	14.00
1921.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9.50

*Granite City previous to April, 1927.

New England, delivered

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$10.00	$10.00	$10.00	$10.00	$10.00	$10.00	$10.00	$10.00	$10.30	$10.50	$10.50	$10.50
1932.....	10.50	10.50	10.50	10.50	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
1931.....	11.00	11.00	11.00	11.00	11.00	10.50	10.50	10.50	10.50	10.50	10.50	10.50
1930.....	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1929.....	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1928.....	11.50	11.50	11.50	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1927.....	13.50	12.65	12.50	12.50	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
1926.....	13.00	13.00	13.00	12.50	12.50	12.00	12.00	12.00	12.00	12.00	13.00	13.50
1925.....	11.50	12.00	12.00	12.00	12.00	11.50	11.50	11.65	12.00	12.00	12.90	13.00
1924.....	12.50	12.50	12.50	12.00	12.00	11.30	*11.80	11.50	11.50	11.50	11.50	11.50
1923.....	16.00	16.00	16.00	16.00	16.00	15.50	13.50	13.50	13.50	13.50	12.50	12.50
1922.....	10.40	10.25	10.15	10.15	10.15	10.15	14.00	16.30	16.50	16.50	16.20	16.00
1921.....	.....	.....	.....	.....	.....	.....	.....	.....	10.66	10.66	10.66	10.66

*Prior to this, Boston delivered.

Beehive Coke

Per Net Ton

Foundry, Spot, Connellsville

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$2.50	$2.50	$2.25	$2.25	$2.25	$2.40	$2.80	$3.10	$3.15	$3.85	$4.25	$4.25
1932.....	3.25	3.25	3.25	3.25	3.15	3.00	3.00	2.90	2.75	2.75	2.65	2.50
1931.....	3.30	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1930.....	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1929.....	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.55	3.50
1928.....	3.75	3.75	3.75	3.65	3.55	3.50	3.50	3.75	3.75	3.75	3.75	3.75
1927.....	4.25	3.85	4.15	4.05	3.80	3.90	4.00	4.00	4.00	3.75	3.75	3.65
1926.....	6.40	6.50	4.45	4.10	3.85	3.75	3.70	3.60	4.15	4.65	5.85	4.75
1925.....	5.10	4.30	3.85	3.85	3.70	3.75	3.75	3.80	4.20	5.95	6.85	5.30
1924.....	4.35	4.80	4.85	4.60	4.30	4.15	4.05	4.00	4.00	4.00	4.05	4.25
1923.....	9.00	8.60	8.15	7.80	6.10	5.50	5.15	5.20	5.70	4.80	4.85	5.15
1922.....	3.85	3.80	4.05	4.95	6.50	7.20	11.40	14.30	12.75	12.10	8.40	7.50
1921.....	6.50	6.30	6.05	5.00	4.85	4.50	4.45	4.00	4.30	4.50	4.30	4.15
1920.....	7.00	7.00	7.00	11.60	12.50	15.00	16.00	18.25	17.90	16.85	9.40	7.25
1919.....	7.05	5.15	4.80	4.55	4.35	4.70	4.80	5.20	5.90	5.60	6.95	7.15
1918.....	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1917.....	10.40	10.90	11.30	9.65	9.65	11.20	15.00	12.70	13.35	7.00	7.00	7.00
1916.....	3.75	3.75	3.60	3.85	3.10	3.00	3.00	3.05	3.25	4.35	8.60	9.25
1915.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.05	2.25	2.30	2.95	3.15
1914.....	2.50	2.40	2.40	2.40	2.40	2.35	2.30	2.25	2.25	2.20	2.10	2.00
1913.....	4.45	3.70	3.50	3.05	2.90	2.85	2.85	2.85	2.85	2.75	2.50	2.50
1912.....	2.05	2.20	2.65	2.75	2.60	2.55	2.45	2.60	2.65	3.35	4.40	4.50
1911.....	1.95	1.95	2.00	2.00	1.90	1.75	1.80	1.85	1.85	1.85	1.90	1.90
1910.....	3.00	2.90	2.80	2.55	2.30	2.15	2.10	2.15	2.10	2.05	2.00	2.00
1909.....	1.70	1.60	1.55	1.50	1.45	1.50	1.50	1.65	2.30	2.75	2.80	2.75
1908.....	1.80	1.75	1.70	1.65	1.65	1.65	1.65	1.65	1.65	1.70	1.75	1.80
1907.....	3.75	3.55	3.00	2.70	2.15	2.05	2.40	2.60	2.80	2.90	2.40	2.00
1906.....	3.00	2.40	2.35	2.60	2.55	2.40	2.55	2.70	2.75	2.85	3.20	3.60
1905.....	2.80	2.50	2.50	2.00	1.90	1.85	1.80	1.85	2.00	2.70	3.00	2.85
1904.....	1.45	1.50	1.55	1.50	1.45	1.40	1.40	1.40	1.40	1.45	1.85	2.15
1903.....	4.50	4.50	4.00	3.75	3.50	3.00	2.50	2.00	2.00	1.90	1.90	1.75
1902.....	2.25	2.25	2.50	2.50	2.50	2.50	2.50	3.25	4.00	5.00	5.00	5.00
1901.....	1.75	1.75	2.00	2.00	2.00	1.85	1.75	1.75	1.75	2.00	2.00	2.00
1900.....	3.00	3.50	4.00	3.75	3.00	2.50	2.00	1.75	1.75	1.75	1.75	1.75

Furnace, Spot, Connellsville

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$1.75	$1.75	$1.75	$1.75	$1.75	$1.80	$2.40	$2.75	$2.50	$3.25	$3.75	$3.75
1932.....	2.25	2.25	2.25	2.25	2.15	2.00	2.00	2.00	2.00	2.00	1.80	1.80
1931.....	2.50	2.50	2.50	2.50	2.45	2.40	2.40	2.40	2.40	2.40	2.35	2.30
1930.....	3.55	2.60	2.60	2.60	2.55	2.50	2.50	2.50	2.60	2.60	2.55	2.50
1929.....	2.75	2.90	2.95	2.75	2.75	2.75	2.75	2.75	2.65	2.65	2.65	2.65
1928.....	2.70	2.65	2.60	2.60	2.55	2.60	2.60	2.75	2.75	2.80	2.75	2.75
1927.....	3.35	3.35	3.30	3.20	2.80	2.85	2.90	3.00	2.85	2.85	2.80	2.65
1926.....	6.90	7.45	3.15	3.05	2.85	2.70	2.65	2.85	3.25	3.65	4.75	3.65
1925.....	4.10	3.65	3.35	3.10	3.10	2.80	2.80	3.10	3.45	5.65	6.35	3.90
1924.....	3.80	4.00	4.05	3.55	3.25	3.15	2.85	3.00	3.00	3.00	3.00	3.35
1923.....	8.25	7.20	7.15	6.25	5.10	4.65	4.35	4.45	4.55	3.85	3.80	4.20
1922.....	2.75	2.95	3.25	4.30	6.00	6.60	10.65	13.20	11.00	10.60	7.10	6.25
1921.....	5.15	4.85	4.55	3.60	3.25	3.15	2.75	2.85	3.15	3.25	3.15	2.95
1920.....	6.00	6.00	6.00	11.20	12.00	14.50	15.20	17.75	16.90	15.15	8.40	6.25
1919.....	5.85	4.40	4.30	4.05	3.95	4.10	4.25	4.60	4.95	4.35	5.75	6.20
1918.....	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
1917.....	9.05	11.20	9.40	7.60	8.35	11.40	12.10	13.70	12.10	6.00	6.00	6.00
1916.....	2.50	3.00	3.00	2.25	2.25	2.55	2.70	2.75	2.95	5.30	7.05	8.25
1915.....	1.60	1.55	1.50	1.50	1.55	1.55	1.70	1.50	1.60	1.70	2.10	2.10
1914.....	1.80	1.80	1.95	1.90	1.75	1.75	1.75	1.75	1.65	1.65	1.60	1.60

Iron and Steel Scrap

Per Gross Ton Delivered

Heavy Melting Steel, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$ 8.35	$ 8.25	$ 8.75	$ 9.90	$11.65	$11.65	$12.70	$13.75	$13.00	$12.45	$11.65	$11.50
1932.....	10.25	10.25	10.25	10.20	9.75	9.00	8.35	8.55	9.50	9.50	9.15	8.75
1931.....	13.00	12.75	12.90	12.50	11.25	10.30	10.50	10.70	10.80	10.45	10.25	10.25
1930.....	16.55	16.90	16.60	16.05	15.40	15.10	14.90	15.20	15.70	14.80	12.85	12.75
1929.....	19.00	18.60	18.50	18.60	17.85	18.30	18.45	18.90	18.45	17.30	16.30	15.10
1928.....	15.35	15.05	14.75	14.85	15.00	14.70	14.10	15.00	16.55	17.35	17.35	17.50
1927.....	17.00	16.10	16.40	16.50	15.50	15.10	14.95	15.00	15.00	14.50	14.50	14.60
1926.....	18.75	17.60	17.70	16.90	16.00	15.85	16.70	17.75	17.75	17.00	17.00	17.00
1925.....	22.10	19.00	18.25	17.00	16.60	17.10	17.20	19.25	19.00	18.40	19.50	19.00
1924.....	21.10	21.60	19.75	16.60	15.40	16.25	17.30	17.75	18.60	18.20	19.85	21.00
1923.....	21.65	23.40	26.10	25.85	22.50	20.50	18.25	17.50	18.00	16.10	15.70	18.50
1922.....	14.50	13.95	14.95	16.50	17.00	17.40	16.50	17.10	19.50	21.35	20.30	20.00
1921.....	15.00	15.00	15.00	13.00	13.60	13.10	12.00	12.60	13.20	14.00	14.25	14.25
1920.....	26.50	28.15	28.00	26.40	25.50	25.30	25.70	27.75	28.60	28.00	24.00	17.20
1919.....	20.80	17.00	14.60	15.75	15.55	17.25	19.90	21.25	20.50	20.00	21.90	24.65
1918.....	30.00	30.00	30.00	29.00	29.00	29.00	29.00	29.00	29:00	29.00	29.00	29.00
1917.....	23.25	21.90	23.40	28.15	28.40	40.00	40.25	36.60	35.50	31.30	29.60	30.00
1916.....	17.50	17.35	17.95	18.10	17.10	16.25	16.25	16.00	16.10	17.80	20.55	26.75
1915.....	11.55	11.60	12.00	11.90	11.75	11.75	11.75	13.38	14.25	14.00	15.30	17.40
1914.....	11.30	12.15	12.40	12.25	12.00	12.00	12.00	11.65	11.65	11.40	10.40	10.45
1913.....	15.15	14.90	14.40	14.40	14.15	13.50	12.75	12.65	12.65	12.65	11.75	11.20
1912.....	12.50	12.65	12.40	13.00	13.40	13.40	13.65	13.55	13.90	14.40	15.30	15.00
1911.....	13.50	14.30	14.40	13.50	12.75	13.15	12.90	13.40	13.15	12.25	12.15	12.50
1910.....	17.90	17.65	17.00	17.00	16.00	15.25	14.50	14.25	14.25	14.40	14.15	13.75
1909.....	16.50	16.00	14.75	14.15	14.95	15.50	15.75	16.00	16.75	17.90	18.15	17.95
1908.....	13.25	13.25	13.50	12.75	12.75	13.00	13.25	14.75	14.75	14.50	14.75	16.25
1907.....	19.25	18.75	18.25	18.25	18.15	18.65	18.50	18.25	17.75	17.50	15.45	13.75
1906.....	17.75	16.65	15.90	14.65	15.25	15.00	15.75	16.00	16.90	16.75	17.25	19.75
1905.....	16.75	16.15	16.50	16.50	15.40	14.50	14.25	14.15	15.40	16.20	17.15	18.25
1904.....	12.65	13.25	13.75	14.15	13.05	11.50	10.75	11.15	11.75	12.00	13.65	14.90
1903.....	22.25	21.75	21.25	22.15	21.65	20.50	20.25	18.75	18.25	16.00	14.50	11.50
1902.....	17.25	17.45	18.55	19.40	20.25	21.40	22.25	21.25	21.25	21.65	21.15	22.25

Heavy Melting Steel, Detroit (dealers)

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$4.50	$4.50	$4.50	$5.40	$7.75	$7.80	$8.95	$9.50	$8.55	$7.35	$7.00	$7.25
1932.....	5.55	5.75	5.75	5.70	5.10	4.75	3.90	4.25	5.55	5.75	5.30	4.60
1931.....	9.50	9.50	9.15	8.65	8.15	7.40	7.55	7.30	6.80	6.15	6.00	5.80
1930.....	12.25	12.00	11.85	11.70	11.30	11.00	10.85	10.95	11.15	10.95	9.95	9.55
1929.....	14.20	14.35	14.05	14.25	13.90	13.50	13.75	14.35	14.20	13.40	12.40	12.50
1928.....	11.44	11.25	11.05	10.75	11.00	10.88	10.38	10.50	11.69	12.50	13.30	13.50
1927.....	12.50	12.50	12.70	12.88	11.88	11.50	11.56	11.75	11.70	11.50	11.38	11.25
1926.....	14.75	14.75	14.75	13.35	12.50	12.00	12.80	13.50	12.94	12.75	11.94	12.20

Heavy Melting Steel, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$5.25	$5.25	$5.25	$6.55	$8.70	$8.80	$10.45	$10.40	$9.95	$9.35	$8.35	$8.75
1932.....	7.25	6.80	6.75	6.55	6.20	5.60	4.50	5.40	5.75	6.00	5.75	5.50
1931.....	10.00	9.85	9.75	9.60	8.65	8.50	8.50	8.25	7.95	7.75	7.65	7.50
1930.....	12.65	13.25	13.20	13.00	12.55	12.05	12.00	12.00	12.25	11.55	10.20	10.00
1929.....	16.50	16.00	15.55	15.95	15.45	14.95	14.75	15.05	15.05	14.45	13.05	12.50
1928.....	12.25	12.55	12.75	12.75	12.95	12.60	12.30	12.65	12.90	13.75	14.50	14.50
1927.....	13.20	13.10	13.05	13.10	12.35	12.00	12.10	12.35	12.20	11.75	11.50	11.95
1926.....	14.95	13.75	14.00	13.20	12.25	12.65	14.20	14.00	14.10	13.05	13.00	12.90
1925.....	19.45	17.55	16.70	15.00	14.90	15.90	15.35	16.05	16.45	16.25	16.40	15.80
1924.....	17.40	18.00	16.70	14.65	13.75	13.55	14.75	15.40	16.40	16.25	17.05	18.50
1923.....	18.70	19.75	23.15	22.40	19.75	17.75	17.10	16.25	16.55	14.50	13.80	16.00
1922.....	11.20	11.15	12.05	13.55	14.65	14.45	15.15	15.85	18.15	18.50	17.40	16.75
1921.....	15.25	15.25	12.55	11.25	11.50	11.20	10.55	10.70	11.30	12.55	12.40	11.00
1920.....	24.25	25.05	24.20	23.95	23.15	22.40	23.70	24.15	24.20	21.40	18.50	16.75
1919.....	19.20	14.90	15.25	16.40	15.40	16.75	19.40	20.75	19.00	18.80	20.65	21.25
1918.....	29.70	30.00	30.00	28.65	28.90	29.00	29.00	29.00	290.0	29.00	29.00	26.50
1917.....	20.25	21.65	23.00	26.65	28.70	37.00	35.50	33.10	32.65	27.00	28.50	28.90
1916.....	15.50	15.25	16.20	16.75	16.50	15.35	14.15	14.90	15.50	16.50	19.35	23.35
1915.....	8.90	9.45	9.75	9.30	9.25	9.40	10.15	11.50	12.00	11.55	13.15	15.40
1914.....	9.20	10.00	9.80	9.50	9.95	9.75	9.50	9.50	9.40	9.00	8.25	8.25
1913.....	12.75	12.50	12.50	12.50	12.00	12.00	12.00	12.00	12.00	12.00	9.00	9.00
1912.....	11.00	10.75	11.25	12.25	12.25	12.25	11.75	12.50	13.00	14.00	13.75	13.75
1911.....	11.50	12.00	12.00	11.50	10.25	10.25	10.25	10.75	10.50	10.00	9.75	9.75
1910.....	16.00	15.50	14.50	14.50	13.00	13.00	12.50	12.25	12.25	12.25	12.00	12.00
1909.....	14.00	13.40	12.15	12.90	13.50	14.15	14.05	14.95	15.80	16.30	15.75	15.50

Market History—

Heavy Melting Steel, Eastern Pennsylvania

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$6.50	$6.50	$6.50	$6.90	$9.00	$9.50	$10.55	$12.00	$10.70	$10.20	$9.55	$10.50
1932.....	7.50	7.35	7.35	7.20	6.50	6.25	6.25	6.40	7.25	7.25	7.25	6.50
1931.....	10.50	10.50	10.50	10.00	9.50	8.75	8.25	8.55	8.75	8.20	7.95	7.50
1930.....	14.50	14.50	14.95	13.95	13.40	13.25	12.50	12.65	13.00	12.00	11.50	11.00
1929.....	16.50	16.30	16.25	17.00	16.25	16.25	16.50	16.75	16.37	15.80	15.15	14.50
1928.....	14.00	14.00	13.75	13.75	13.75	13.15	12.75	12.75	14.65	16.00	15.90	15.50
1927.....	15.60	15.00	14.75	14.75	14.45	14.25	13.75	13.75	14.00	14.00	14.00	14.00
1926.....	17.35	16.35	16.20	15.90	15.25	15.25	15.50	16.75	16.85	16.65	15.95	15.50
1925.....	20.00	17.85	16.25	15.50	15.00	15.65	16.00	16.75	17.25	17.00	17.60	17.70
1924.....	18.05	18.95	17.00	15.25	14.20	15.00	15.00	16.50	15.90	16.50	18.05	19.00
1923.....	19.70	21.20	24.85	23.50	20.40	18.65	17.25	16.00	16.85	15.50	15.50	17.00
1922.....	11.75	12.25	13.15	14.35	15.15	15.30	15.00	15.25	17.10	18.00	16.70	16.00
1921.....	15.00	14.50	13.40	11.75	11.80	11.85	11.25	11.25	11.75	12.25	12.60	12.00
1920.....	24.25	25.75	25.55	24.30	23.60	22.40	22.00	24.10	26.40	23.80	20.30	16.90
1919.....	19.00	15.25	14.25	15.85	15.30	16.15	18.85	19.60	19.00	19.55	20.80	23.90
1918.....	29.80	30.00	29.50	28.30	28.50	28.50	28.50	28.50	28.50	28.50	28.00	25.00
1917.....	21.75	20.25	23.50	25.00	26.00	32.60	37.00	32.80	30.75	26.00	26.80	28.00
1916.....	15.50	14.95	16.15	16.80	16.35	15.35	13.95	15.40	16.65	17.50	21.25	26.00
1915.....	10.00	10.50	11.00	11.25	11.50	11.50	12.00	13.50	14.50	15.00	14.50	16.00
1914.....	10.50	11.25	11.50	11.00	10.75	10.75	10.50	10.75	10.75	9.75	9.50	9.50
1913.....	14.50	13.50	13.50	13.75	12.50	12.00	11.50	11.75	12.00	11.00	10.25	10.00
1912.....	12.25	12.00	12.25	13.00	13.75	13.50	13.75	14.25	14.75	15.50	15.25	15.00
1911.....	12.75	14.25	14.25	13.75	13.25	13.00	13.00	13.25	12.75	12.00	12.25	12.50
1910.....	17.00	16.50	16.50	15.50	14.50	14.50	14.00	13.75	14.00	13.50	12.75	12.50
1909.....	17.00	15.50	13.75	13.50	14.50	15.50	16.00	17.00	17.50	18.00	18.00	17.25

No. 1 Railroad Wrought, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$5.00	$5.00	$5.00	$5.50	$8.10	$8.10	$10.20	$10.35	$9.25	$9.10	$8.10	$7.50
1932.....	7.25	6.85	6.25	5.85	5.25	5.00	4.60	4.50	5.60	5.60	5.60	5.00
1931.....	9.50	9.25	9.00	8.80	8.40	8.25	8.25	8.25	8.00	8.00	8.00	7.45
1930.....	13.40	13.70	13.50	13.30	12.70	11.50	11.25	11.25	11.25	10.95	10.20	10.00
1929.....	14.75	15.75	16.00	16.65	16.40	15.40	14.85	15.40	15.70	14.85	13.85	13.25
1928.....	12.65	12.40	12.45	12.45	13.05	12.70	12.30	12.40	12.90	13.50	14.25	14.50
1927.....	14.20	13.95	13.50	13.50	12.75	12.10	12.35	13.45	12.70	11.40	11.25	11.25
1926.....	15.00	14.40	14.50	14.05	12.55	12.65	14.80	14.75	14.56	14.50	13.75	13.75
1925.....	19.15	17.75	16.65	14.60	14.65	15.90	15.90	17.45	17.05	16.30	17.70	15.90
1924.....	17.50	17.50	16.05	14.80	13.60	13.25	14.80	15.75	16.70	15.95	17.10	18.75
1923.....	19.40	20.50	23.25	22.75	19.95	16.95	16.60	17.05	18.25	15.30	14.10	16.00
1922.....	11.80	11.65	12.25	13.25	14.35	14.20	15.20	16.35	19.95	20.40	18.10	17.00
1921.....	15.65	15.90	13.50	12.05	11.90	10.80	10.25	11.75	13.05	14.65	13.70	12.10
1920.....	29.00	30.75	30.70	30.70	29.50	28.00	28.10	28.50	27.50	22.50	19.55	16.60
1919.....	23.30	16.65	17.65	18.50	17.05	18.70	21.20	23.25	21.25	22.00	26.50	27.00
1918.....	35.00	35.00	35.00*	35.00	35.00	35.00	34.50	33.50	33.50	33.50	33.50	29.00
1917.....	23.75	24.00	25.75	29.80	32.60	41.75	39.15	35.40	36.25	31.90	30.60	31.50
1916.....	15.50	14.95	16.15	16.80	16.35	15.35	13.95	15.40	16.65	17.50	21.25	26.00
1915.....	8.80	8.90	9.00	8.55	8.75	8.75	8.90	10.10	10.75	10.70	12.75	14.90

*Quotations net tons to March 31, 1918, gross tons thereafter

No. 1 Railroad Wrought, Eastern Pennsylvania

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$ 6.50	$ 6.50	$ 6.75	$ 7.35	$10.25	$10.25	$11.60	$13.00	$11.60	$10.75	$10.15	$11.00
1932.....	9.35	9.00	9.00	7.95	7.75	6.70	6.25	6.25	7.25	7.25	7.25	6.50
1931.....	13.25	12.50	11.00	11.00	11.00	10.50	10.00	9.75	9.75	9.50	9.50	9.50
1930.....	15.25	15.25	15.25	15.75	15.40	15.25	14.25	14.25	14.25	14.25	13.50	13.50
1929.....	15.50	16.25	16.25	16.25	16.25	16.25	16.25	16.25	16.13	16.00	16.25	15.25
1928.....	15.25	15.25	15.25	15.25	15.25	15.25	15.25	14.80	15.10	15.50	15.50	15.50
1927.....	17.00	17.00	17.65	16.75	16.75	16 75	16.25	15.95	15.75	15.75	15.75	15.75
1926.....	18 35	18.00	18.00	17.75	17.35	17.00	17.00	17.25	17.00	17.00	17.00	17.00
1925.....	21.50	20.50	19.50	18.40	17.60	18.20	18.25	18.25	18.25	18.25	18.75	18.75
1924.....	20.10	21.35	19.00	18.40	17.75	17.75	18.05	18.50	18.75	18.75	18.95	19.00
1923.....	22.25	24.10	27.60	27.00	24.40	22.75	18.85	17.50	19.00	18.00	17.75	19.00
1922.....	15.00	15.00	15.20	15.63	16.80	17.25	18.00	18.00	20.75	22.00	21.00	18.95
1921.....	20.00	20.00	18.20	15.50	15.00	15.00	14.25	14.00	14.20	15.40	16.00	15.75
1920.....	32.90	36.10	36.50	35.25	34.00	33.50	33.50	33.25	34.40	29.85	25.75	20.10
1919.....	29.80	25.00	24.00	21.50	21.90	22.50	24.70	27.25	27.00	27.00	27.85	30.75
1918.....	35.00	35.00	35.00*	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
1917.....	27.00	26.75	30.00	36.00	40.80	47.85	54.05	46.20	44.50	41.80	35.35	35.00
1916.....	22.25	22.50	23.00	23.00	22.50	20.00	19.75	20.00	21.00	22.00	20.55	26.75
1915.....	11.75	12.00	12.50	12.50	12.50	12.75	13.50	15.00	16.00	16.00	17.00	20.00
1914.....	12.90	14.75	15.25	13.15	13.15	12.65	12.65	12.00	12.50	11.50	11.50	11.50
1913.....	16.25	16.25	15.25	16.25	15.50	14.75	14.70	14.25	14.25	13.75	13.75	13.35
1912.....	15.75	14.75	14.50	14.25	16.25	16.00	15.75	15.25	16.65	16.75	17.75	16.75
1911.....	16.25	16.25	17.75	16.75	15.50	15.25	15.25	15.75	15.75	14.50	14.00	14.45
1910.....	18.75	19.00	18.75	19.25	18.25	16.75	16.25	16.25	16.15	16.75	16.25	16.25
1909.....	20.25	19.25	16.25	15.25	16.25	18.60	17.75	18.75	19.75	20.75	21.25	20.25
1908.....	14.25	14.25	15.25	14.75	15.50	15.75	16.00	16.50	18.25	18.25	18.50	19.75
1907.....	23.25	22.25	21.00	20.50	20.00	20.75	20.25	19.75	18.00	18.00	17.25	14.75
1906.....	22.75	21.00	19.75	20.25	20.75	18.25	17.50	18.25	20.75	22.25	22.25	23.25
1905.....	19.75	21.75	22.00	22.75	21.75	18.75	17.00	17.50	19.50	21.75	19.85	23.25
1904.....	14.65	16.00	16.50	18.25	17.75	14.00	12.75	13.25	14.40	15.25	16.25	19.00

*Quotations net tons to March 31, 1918, gross tons thereafter.

No. 1 Cast, Eastern Pennsylvania

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$ 9.00	$ 9.00	$ 9.00	$ 9.10	$10.25	$10.35	$11.20	$11.75	$12.40	$12.00	$11.95	$12.00
1932.....	11.20	10.00	10.00	9.50	9.25	9.00	9.00	9.25	9.25	9.00	9.00	9.00
1931.....	12.80	13.00	13.00	13.00	12.75	12.50	12.50	12.50	12.50	12.50	11.70	11.50
1930.....	16.00	15.75	15.75	15.50	15.00	14.75	13.50	13.50	13.50	13.50	13.50	12.50
1929.....	16.75	16.75	16.50	16.50	16.50	16.50	16.50	16.50	16.25	16.25	16.00	16.00
1928.....	16.75	16.75	16.75	16.25	16.25	16.00	16.00	15.75	16.20	17.00	16.50	16.50
1927.....	17.75	17.50	17.50	17.25	17.25	16.75	16.35	16.25	16.25	16.25	16.75	16.75
1926.....	18.35	18.25	18.25	18.25	18.00	17.75	17.80	18.25	18.15	17.75	17.75	17.75
1925.....	20.75	19.35	18.50	18.20	17.10	17.75	17.75	17.75	18.65	18.75	18.75	18.75
1924.....	20.75	20.35	19.25	18.35	17.10	17.90	17.80	18.00	18.40	17.95	18.25	19.50
1923.....	23.30	24.75	28.00	26.85	24.80	22.75	21.00	20.00	20.35	19.70	19.50	20.50
1922.....	16.75	16.50	17.00	17.40	17.90	18.50	18.00	18.00	20.65	23.00	21.90	20.50
1921.....	24.15	23.35	20.50	18.15	17.90	17.50	17.50	16.50	16.50	17.50	18.00	17.50
1920.....	36.50	38.55	40.00	38.00	38.00	37.00	37.20	38.75	39.80	38.00	34.75	28.90
1919.....	28.15	25.00	22.50	22.50	21.50	22.00	23.50	24.65	25.00	25.15	28.00	31.75
1918.....	33.50	34.50	33.90	32.75	33.00	33.75	34.00	34.00	34.00	34.00	34.00	34.00
1917.....	20.75	20.15	22.50	26.75	30.00	34.75	38.35	34.10	32.90	30.00	30.50	32.00
1916.....	17.50	17.50	17.75	18.00	17.75	16.50	16.00	16.00	16.25	16.50	18.50	22.00
1915.....	12.00	12.00	12.50	12.50	12.00	12.25	12.25	13.50	14.50	14.50	15.00	15.60

Market History—

No. 1 Cast, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$ 8.55	$ 9.00	$ 9.00	$ 9.00	$10.10	$10.40	$10.65	$10.60	$10.60	$11.20	$11.00	$11.00
1932.....	10.00	9.80	9.50	9.50	9.20	9.00	8.60	8.50	9.50	9.50	9.25	9.00
1931.....	12.50	12.50	12.50	12.20	11.50	10.85	10.00	10.00	10.00	10.00	10.00	10.00
1930.....	14.70	14.50	14.50	15.00	14.50	14.00	14.00	14.00	14.00	13.40	12.40	12.50
1929.....	15.30	14.50	15.20	15.45	15.00	15.00	15.00	15.00	15.00	15.00	14.90	14.50
1928.....	14.50	14.50	14.50	14.75	14.60	14.00	14.00	14.05	14.25	14.55	15.10	14.70
1927.....	16.00	15.60	15.60	16.00	15.75	15.10	15.00	15.00	15.00	14.70	14.50	14.50
1926.....	17.40	16.86	17.00	17.00	16.25	15.85	15.60	16.85	16.40	16.10	16.00	16.00
1925.....	19.50	18.85	18.35	17.80	17.00	17.00	17.00	17.10	17.50	17.40	17.75	17.50
1924.....	21.30	20.85	19.60	18.35	17.50	17.75	17.70	18.00	18.35	17.70	18.25	18.50
1923.....	22.65	24.50	27.70	27.75	25.60	23.75	21.50	21.20	21.50	19.35	18.50	20.00
1922.....	16.00	16.00	16.40	17.25	18.50	18.70	19.15	19.00	21.75	23.35	23.30	22.50
1921.....	24.50	22.00	21.00	18.25	17.50	16.00	15.00	14.85	16.30	17.50	17.10	16.25
1920.....	32.50	41.50	41.00	39.60	39.00	40.00	38.50	41.50	42.20	40.75	38.00	27.50
1919.....	25.60	21.00	21.00	21.75	21.00	21.00	21.00	24.00	24.50	25.00	28.75	30.50
1918.....	28.00	28.00	28.00	34.00	32.50	32.50	32.50	32.50	32.50	32.50	32.40	32.00
1917.....	20.00	19.75	21.50	23.35	24.60	33.25	34.75	35.00	32.50	28.00	28.50	28.50

No. 1 Cast, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$5.95	$6.00	$6.20	$7.15	$8.75	$8.75	$9.90	$10.50	$9.85	$9.25	$8.00	$8.25
1932.....	8.90	8.90	8.40	7.85	7.00	6.40	6.15	6.45	7.30	7.30	6.85	6.70
1931.....	10.65	10.65	10.65	10.25	9.80	9.80	9.80	9.80	9.80	9.80	9.00	8.95
1930.....	15.10	15.25	15.70	15.60	14.80	14.25	13.45	13.45	13.45	12.90	10.95	10.65
1929.....	17.70	17.90	17.90	17.90	17.25	16.25	16.25	16.25	16.80	15.65	15.35	15.10
1928.....	15.75	15.75	15.65	15.65	15.90	15.95	15.95	15.95	16.30	16.55	16.90	17.35
1927.....	18.90	18.90	18.50	18.10	17.35	16.65	16.55	16.80	16.80	16.25	15.85	15.70
1926.....	19.40	18.75	18.75	18.65	18.05	18.15	19.55	19.00	18.95	17.90	18.35	18.50
1925.....	22.10	20.15	19.70	18.85	19.00	19.50	19.75	20.30	20.15	19.40	20.90	20.50
1924.....	22.10	22.25	20.80	20.00	19.00	17.75	18.60	19.00	20.25	19.20	19.25	20.75
1923.....	24.30	25.75	28.50	27.55	24.20	23.25	23.25	21.20	21.50	20.40	20.55	21.50
1922.....	14.00	14.50	15.10	16.15	17.40	17.30	17.65	19.70	23.80	24.00	22.90	22.00
1921.....	20.35	21.15	18.10	15.25	15.85	14.90	13.75	13.95	14.50	15.25	15.50	14.00
1920.....	42.50	43.25	42.20	44.10	42.50	41.75	41.20	42.00	39.30	32.75	27.65	22.10
1919.....	26.25	22.05	23.10	23.50	22.35	23.40	20.65	27.75	26.75	28.15	31.10	35.35
1918.....	30.00	30.00	33.00	32.45	30.75	31.00	31.80	33.40	34.00	34.00	32.75	29.00

Cast Borings, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$5.70	$5.70	$5.55	$5.70	$6.90	$7.65	$9.05	$9.80	$9.05	$8.30	$7.60	$7.50
1932.....	6.75	6.50	6.75	6.65	6.40	5.50	4.75	5.15	5.95	6.25	6.50	5.90
1931.....	7.70	7.70	7.65	7.60	7.50	7.75	7.05	7.50	7.45	7.50	7.10	6.80
1930.....	11.10	12.00	11.15	10.75	10.50	9.88	8.50	8.50	8.90	8.40	7.75	7.15
1929.....	12.55	12.25	11.50	12.15	11.55	11.85	12.10	12.50	12.40	11.80	11.15	10.75
1928.....	11.50	11.00	10.70	10.60	10.70	10.40	9.80	10.50	12.00	12.40	12.00	12.50
1927.....	12.50	12.00	12.10	12.38	11.13	10.50	10.50	11.50	11.30	11.00	11.00	11.60
1926.....	14.75	14.25	13.25	12.60	11.75	11.85	12.20	12.75	13.00	12.60	12.50	12.00
1925.....	17.20	15.60	14.50	13.60	12.85	13.40	13.50	14.50	14.85	14.10	15.10	14.80
1924.....	16.50	16.50	15.35	13.65	12.00	13.85	13.75	14.20	14.75	15.20	16.25	17.00
1923.....	18.50	19.75	21.80	21.10	21.60	17.50	15.50	15.00	16.00	13.40	12.40	14.00
1922.....	10.40	11.25	11.85	13.00	14.15	14.80	15.75	15.75	17.30	18.15	17.75	17.50
1921.....	12.50	12.35	11.60	9.70	9.50	9.00	7.60	8.00	9.05	11.60	10.65	9.55
1920.....	19.35	21.70	20.35	19.85	19.25	18.35	18.25	19.55	20.50	19.35	17.00	14.50
1919.....	14.00	11.80	10.95	12.60	11.30	11.65	13.90	16.10	15.75	15.75	17.95	18.35
1918.....	20.00	20.00	20.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	18.00
1917.....	12.35	12.25	13.20	14.70	15.45	21.10	23.90	22.00	23.55	20.70	20.00	20.00
1916.....	11.35	11.40	11.40	11.30	10.30	9.90	8.65	8.00	8.50	9.15	9.85	13.35
1915.....	8.25	8.15	8.40	8.40	8.40	8.65	8.65	9.00	9.25	9.75	10.00	10.20
1914.....	7.90	8.40	9.25	8.40	8.40	7.90	8.15	8.50	8.50	8.25	8.25	8.25
1913.....	10.40	10.40	10.40	10.40	10.40	9.25	8.40	8.15	8.15	8.40	7.75	7.45
1912.....	9.65	9.40	9.15	9.65	10.15	10.15	10.25	10.15	9.90	9.90	10.50	10.40
1911.....	8.65	8.65	9.50	8.75	8.50	8.90	8.90	9.25	9.40	8.50	8.25	8.35
1910.....	11.00	10.75	9.75	9.75	9.25	8.75	8.00	8.25	8.40	8.40	8.50	8.65
1909.....	10.75	9.75	8.25	7.75	7.25	9.65	9.75	9.50	10.65	8.75	9.75	11.00
1908.....	6.50	7.50	8.00	8.00	7.50	7.75	7.75	8.75	8.75	8.75	9.95	11.00
1907.....	12.40	12.65	13.15	13.65	13.50	13.75	13.75	13.25	13.25	13.00	10.75	6.50
1906.....	10.90	10.15	9.65	8.15	8.90	8.75	8.75	9.00	9.75	10.25	10.75	12.25
1905.....	10.75	11.25	11.15	10.90	10.15	10.00	9.15	8.40	8.90	9.75	10.50	10.90
1904.....	6.00	5.75	5.40	6.15	7.15	5.65	5.75	5.25	6.25	6.25	7.40	8.75
1903.....	11.25	11.50	11.65	11.25	11.25	.....	.....	9.00	9.00	7.00	.....	5.25
1902.....	8.55	9.15	9.65	10.75	11.75	12.00	11.65	10.75	14.40	15.85	11.65	11.50

Machine Shop Turnings, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$6.25	$6.25	$6.30	$6.75	$8.00	$8.40	$9.35	$10.45	$9.75	$9.30	$8.00	$8.00
1932.....	6.95	7.10	7.25	6.75	6.30	5.25	5.00	5.25	5.95	6.00	6.25	6.00
1931.....	6.00	6.80	7.80	7.30	6.75	6.50	6.70	7.30	7.50	7.20	7.00	7.00
1930.....	11.50	11.75	11.00	11.00	10.20	9.50	8.70	8.00	8.00	7.20	6.15	6.00
1929.....	12.50	11.25	10.65	11.05	11.00	11.35	11.85	12.40	12.00	11.40	10.75	10.25
1928.....	10.60	10.15	10.15	10.25	9.90	9.20	8.80	9.65	11.00	11.25	10.85	12.00
1927.....	12.00	11.00	11.60	12.40	11.15	10.50	10.85	12.50	11.75	11.50	11.15	11.45
1926.....	14.50	13.60	13.00	12.60	11.65	11.00	11.60	12.85	13.05	12.00	11.85	11.50
1925.....	17.80	16.00	14.75	13.60	12.75	13.25	13.50	14.50	14.85	14.15	14.85	14.50
1924.....	15.50	16.10	15.00	13.25	11.10	13.00	13.50	14.00	14.75	11.40	16.00	17.50
1923.....	16.75	18.25	20.65	20.10	18.91	16.60	13.50	11.40	12.75	11.40	11.00	13.50
1922.....	9.50	9.55	10.65	12.30	13.45	13.65	13.75	13.95	15.45	15.40	16.25	15.90
1921.....	10.50	10.50	9.70	8.55	8.50	7.90	7.25	7.65	8.55	10.25	10.25	9.20
1920.....	16.75	19.25	18.40	16.85	15.15	17.65	13.55	15.75	15.80	16.00	14.75	11.60
1919.....	11.50	9.70	9.75	11.15	10.00	10.65	12.70	14.00	13.25	12.75	14.00	15.50
1918.....	20.00	20.00	20.00	19.00	18.70	18.50	18.50	18.50	18.50	18.50	18.50	17.75
1917.....	12.10	12.00	12.45	13.90	14.55	20.80	23.70	21.20	23.25	19.50	19.65	20.00
1916.....	10.35	9.55	10.75	11.20	10.35	10.05	8.55	7.75	7.25	8.00	9.10	12.75
1915.....	7.75	7.90	7.90	7.90	7.90	8.15	8.00	7.65	8.65	8.65	9.15	8.75
1914.....	6.90	7.65	7.65	8.70	8.00	7.90	7.90	7.90	7.90	8.00	7.95	7.75
1913.....	10.65	10.25	9.50	9.00	8.65	7.25	6.75	6.75	6.75	7.15	7.15	6.40
1912.....	10.25	9.75	9.50	10.00	10.25	10.90	11.00	11.00	10.65	10.90	11.50	11.25
1911.....	9.00	9.40	10.50	9.50	9.15	9.15	9.15	9.75	9.65	9.15	9.90	9.35
1910.....	13.25	13.00	12.00	11.75	11.25	10.25	9.25	9.25	9.00	9.00	9.15	9.25
1909.....	13.00	11.75	10.25	8.75	8.25	11.25	11.75	11.50	12.50	13.25	13.75	13.25
1908.....	7.75	8.75	8.75	8.50	8.25	8.25	8.25	9.00	9.50	9.50	10.50	11.75
1907.....	15.25	15.00	15.75	16.00	15.75	15.50	15.50	15.25	14.50	14.00	11.60	7.75
1906.....	.....	.....	12.50	11.75	11.25	11.25	11.25	11.50	12.40	12.25	12.40	14.75

Market History—

Low Phosphorus Scrap, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$10.00	$10.25	$10.70	$11.10	$13.55	$13.70	$14.55	$16.00	$15.10	$14.30	$13.50	$13.50
1932.....	13.90	13.00	13.15	13.85	13.00	12.00	10.60	10.50	10.50	10.60	10.75	10.50
1931.....	17.20	17.50	17.50	17.20	16.25	14.75	13.50	13.50	14.00	14.00	14.00	14.00
1930.....	21.50	21.75	21.85	21.60	20.50	19.50	19.00	19.35	20.00	19.30	17.60	17.50
1929.....	22.00	22.50	22.35	23.25	22.40	22.25	22.50	22.80	23.00	22.20	21.75	20.50
1928.....	18.85	18.50	18.20	18.35	18.50	18.50	18.50	19.00	20.00	20.75	21.00	21.00
1927.....	20.25	19.50	20.00	20.50	19.10	19.10	19.00	19.00	20.00	19.50	18.60	18.50
1926.....	24.00	22.00	21.50	20.90	19.50	19.75	20.30	21.75	21.60	20.25	20.40	20.30
1925.....	26.20	25.35	23.85	21.60	21.75	22.40	22.50	22.50	23.00	23.40	24.00	24.00
1924.....	23.90	24.25	23.75	20.60	19.30	21.40	21.70	22.00	22.25	22.30	23.50	25.00
1923.....	25.15	27.00	31.30	32.10	28.30	25.00	23.15	22.70	23.50	22.50	20.70	22.50
1922.....	17.50	17.10	17.10	18.60	20.00	20.60	21.00	20.60	22.90	24.85	25.00	24.50
1921.....	24.50	22.00	21.20	18.25	18.00	17.00	15.25	15.50	16.30	18.00	17.65	17.25
1920.....	31.50	33.00	32.60	30.60	30.00	30.75	30.00	33.15	34.00	33.75	31.00	25.50
1919.....	29.40	24.25	22.50	22.40	22.00	21.25	23.00	24.00	24.00	24.00	25.75	27.50
1918.....	42.20	40.00	40.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	38.60	38.50
1917.....	32.00	30.00	33.00	34.25	36.60	43.50	52.75	43.00	47.25	43.50	39.00	39.00

Iron Car Wheels, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$7.65	$8.15	$8.35	$8.75	$9.75	$9.75	$9.75	$9.75	$9.75	$9.50	$9.25	$9.75
1932.....	7.75	7.00	7.00	6.75	6.35	6.00	5.50	6.15	7.00	7.00	7.10	7.00
1931.....	11.25	10.75	10.60	9.50	9.25	10.20	10.00	9.90	9.50	9.50	9.00	8.75
1930.....	14.05	14.20	14.50	14.45	13.80	13.50	13.50	13.50	13.50	13.10	12.00	11.50
1929.....	14.10	14.50	14.50	14.75	14.50	14.20	13.60	14.00	14.00	14.00	13.60	13.65
1928.....	13.70	14.25	13.95	13.50	13.45	13.10	13.00	13.00	13.00	13.10	14.05	14.05
1927.....	14.95	15.10	15.00	14.85	14.00	13.50	13.80	14.75	14.25	13.50	13.15	13.40
1926.....	18.00	16.30	16.70	16.45	15.65	15.40	16.50	16.50	15.75	14.50	14.50	14.60
1925.....	21.00	19.65	17.50	16.85	15.90	17.40	17.15	17.50	17.60	17.25	18.15	18.40
1924.....	20.60	21.25	19.90	17.50	16.60	15.65	16.40	16.90	18.40	17.90	18.60	19.50
1923.....	25.35	26.50	28.50	27.65	24.30	21.50	20.90	19.60	19.60	18.60	17.85	19.00
1922.....	15.25	14.65	15.90	18.15	18.80	18.25	18.90	20.40	23.50	24.75	24.60	23.75
1921.....	21.50	21.40	16.60	14.45	14.50	13.70	12.75	13.70	14.90	16.15	16.25	15.90
1920.....	36.25	38.75	36.15	38.50	38.25	36.00	35.70	38.40	38.80	37.25	33.25	25.80
1919.....	23.20	21.15	20.00	20.40	20.20	22.00	24.50	25.15	23.50	23.60	28.50	29.75
1918.....	30.40	30.00	30.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	27.50
1917.....	19.75	18.30	20.30	23.25	27.20	37.00	36.75	30.70	31.00	25.90	27.50	29.50
1916.....	14.75	14.05	14.05	14.00	13.15	12.50	11.90	12.00	12.25	12.25	15.95	21.00
1915.....	10.00	10.00	10.00	10.00	9.75	9.85	10.30	11.40	11.75	11.75	12.75	14.75

Rails for Rolling, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$ 8.00	$ 7.75	$ 7.95	$ 8.50	$10.25	$10.25	$11.15	$11.25	$11.25	$11.10	$10.25	$10.25
1932.....	10.30	9.85	9.50	8.90	8.25	7.75	6.60	6.50	7.00	8.00	8.25	8.00
1931.....	13.00	12.10	12.00	11.85	11.15	10.90	10.50	10.50	10.50	10.50	10.00	10.00
1930.....	14.65	14.80	15.00	15.00	14.85	14.55	14.50	14.50	14.50	14.10	13.10	13.00
1929.....	17.10	17.50	17.50	17.50	17.50	17.50	17.50	17.75	17.60	17.05	15.30	14.60
1928.....	15.00	15.00	14.45	14.00	14.35	14.85	14.50	15.00	15.80	16.40	16.50	16.50
1927.....	16.00	16.00	15.50	15.85	15.10	14.60	14.60	15.00	15.20	14.70	13.95	14.00
1926.....	17.55	16.30	16.50	16.00	14.95	15.10	17.10	17.25	17.25	16.65	16.50	16.50
1925.....	20.95	19.15	18.15	15.85	16.75	18.15	17.45	19.10	19.00	18.55	19.40	18.80
1924.....	18.90	20.00	19.30	17.10	15.30	14.55	15.50	16.00	17.40	17.20	18.20	19.50
1923.....	20.55	22.00	24.90	23.65	21.80	19.40	18.40	17.75	18.30	16.25	15.10	17.00
1922.....	12.50	11.50	12.85	14.25	15.50	15.40	16.00	16.75	19.40	20.50	18.90	18.00
1921.....	15.80	15.90	13.30	12.70	13.25	12.80	12.45	12.70	13.05	14.00	13.90	12.50
1920.....	33.60	34.65	32.60	32.50	31.50	32.35	34.90	38.00	38.50	34.00	24.15	17.40
1919.....	22.30	15.55	16.30	17.95	17.45	19.25	24.70	29.00	25.38	26.80	31.15	31.50
1918.....	35.30	35.00	35.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
1917.....	27.25	25.65	27.25	31.90	36.80	46.00	46.25	41.90	41.25	36.00	35.70	35.65
1916.....	17.70	17.10	17.20	17.90	17.25	16.25	15.70	15.70	16.90	18.75	24.90	29.50
1915.....	9.50	9.60	10.00	9.85	10.00	10.00	10.10	11.75	13.15	13.25	14.30	16.70
1914.....	11.00	11.20	11.25	11.25	11.25	11.25	11.25	11.25	10.85	10.00	9.50	9.50
1913.....	16.25	15.50	15.00	14.50	14.00	14.00	12.00	12.50	12.00	12.00	12.00	11.50
1912.....	13.00	13.00	12.75	12.75	13.25	13.50	13.25	13.50	14.75	16.00	16.50	16.50
1911.....	13.50	13.50	13.50	13.00	12.75	12.25	12.25	12.50	12.25	12.25	12.00	12.25
1910.....	17.75	17.75	17.50	17.50	17.25	16.50	16.50	15.50	15.75	15.75	15.00	14.00
1909.....	15.80	15.05	12.80	13.20	14.65	15.50	15.55	16.00	17.20	18.00	20.25	17.70
1908.....	12.30	13.00	12.20	12.75	13.20	14.00	14.45	15.60	16.00	15.70	16.95	17.25

Finished Material

Per pound f.o.b.

Steel Bars, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	1.60c	1.60c	1.60c	1.60c	1.60c	1.60c	1.60c	1.60c	1.60c	1.75c	1.75c	1.75c
1932.....	1.55	1.50	1.55	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1931.....	1.65	1.65	1.65	1.65	1.65	1.65	1.60	1.60	1.60	1.60	1.60	1.60
1930.....	1.90	1.85	1.85	1.80	1.75	1.75	1.70	1.65	1.60	1.60	1.60	1.60
1929.....	1.90	1.90	1.90	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.90	1.90
1928.....	1.80	1.85	1.90	1.85	1.85	1.85	1.85	1.85	1.90	1.95	1.95	1.90
1927.....	1.95	1.90	1.90	1.90	1.85	1.85	1.80	1.80	1.80	1.75	1.75	1.80
1926.....	2.00	2.00	2.00	2.00	1.95	1.90	2.00	2.00	2.00	2.00	2.00	2.00
1925.....	2.10	2.10	2.10	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1924.....	2.40	2.40	2.40	2.30	2.25	2.20	2.15	2.10	2.05	2.00	2.05	2.10
1923.....	2.00	2.15	2.30	2.35	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
1922.....	1.50	1.40	1.45	1.50	1.60	1.65	1.70	1.80	2.00	2.00	2.00	2.00
1921.....	2.35	2.15	2.00	2.05	2.10	2.05	1.85	1.75	1.65	1.60	1.55	1.50
1920.....	3.10	3.85	3.85	3.65	3.25	3.25	3.25	3.25	3.25	3.25	3.00	2.35
1919.....	2.70	2.70	2.60	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.45	2.90
1918.....	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90
1917.....	3.20	3.20	3.45	3.65	3.65	4.00	4.70	4.75	4.25	2.90	2.90	2.90
1916.....	2.40	2.40	2.65	3.00	3.00	2.85	2.75	2.55	2.60	2.70	2.95	3.15
1915.....	1.10	1.10	1.15	1.20	1.20	1.20	1.30	1.35	1.30	1.45	1.70	1.90
1914.....	1.20	1.20	1.20	1.15	1.15	1.15	1.15	1.15	1.20	1.15	1.10	1.10
1913.....	1.45	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.35	1.25
1912.....	1.15	1.15	1.10	1.15	1.20	1.20	1.25	1.30	1.35	1.40	1.40	1.40
1911.....	1.40	1.40	1.40	1.40	1.40	1.25	1.25	1.20	1.15	1.10	1.10	1.10
1910.....	1.50	1.45	1.45	1.45	1.45	1.45	1.45	1.40	1.40	1.40	1.40	1.40
1909.....	1.40	1.30	1.20	1.15	1.20	1.20	1.25	1.35	1.40	1.40	1.45	1.50
1908.....	1.60	1.60	1.60	1.60	1.60	1.50	1.40	1.40	1.40	1.40	1.40	1.40
1907.....	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1906.....	2.00	1.75	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.55	1.60
1905.....	1.45	1.45	1.50	1.50	1.50	1.50	1.50	1.50	1.60	1.70	1.80	1.95
1904.....	1.30	1.30	1.35	1.35	1.30	1.30	1.30	1.30	1.30	1.35	1.30	1.40
1903.....	1.65	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.30
1902.....	1.60	1.50	1.50	1.65	1.80	1.80	1.70	1.75	1.75	1.70	1.60	1.70
1901.....	1.20	1.25	1.45	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.60	1.60

Market History—

Tank Plates, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	1.60c	1.60c	1.60c	1.55c	1.50c	1.55c	1.60c	1.60c	1.60c	1.70c	1.70c	1.70c
1932.....	1.55	1.50	1.55	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1931.....	1.65	1.65	1.65	1.65	1.65	1.65	1.60	1.60	1.60	1.60	1.60	1.50
1930.....	1.90	1.85	1.80	1.80	1.75	1.70	1.65	1.65	1.60	1.60	1.60	1.60
1929.....	1.90	1.90	1.90	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.90
1928.....	1.80	1.85	1.90	1.85	1.85	1.85	1.85	1.85	1.90	1.95	1.95	1.90
1927.....	1.90	1.85	1.90	1.85	1.85	1.80	1.80	1.80	1.80	1.75	1.75	1.80
1926.....	1.90	1.85	1.85	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
1925.....	2.00	2.10	2.10	2.00	2.00	2.00	2.00	1.90	1.80	1.80	1.85	1.90
1924.....	2.50	2.45	2.40	2.35	2.25	2.15	2.10	2.00	1.95	1.80	1.85	1.90
1923.....	2.05	2.15	2.35	2.45	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1922.....	1.50	1.40	1.45	1.50	1.60	1.65	1.70	1.80	2.00	2.00	2.00	2.00
1921.....	2.65	2.35	2.05	2.15	2.20	2.00	1.85	1.75	1.70	1.60	1.60	1.50
1920.....	3.10	3.70	3.75	3.65	3.50	3.50	3.50	3.50	3.50	3.20	3.00	2.65
1919.....	3.00	3.00	2.90	2.65	2.65	2.65	2.65	2.65	2.55	2.65	2.65	2.70
1918.....	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1917.....	4.25	4.30	5.00	5.45	6.40	7.75	9.45	9.20	7.50	3.25	3.25	3.25
1916.....	2.50	2.55	3.15	3.50	3.50	3.50	3.50	3.75	3.70	3.70	3.90	4.25
1915.....	1.10	1.10	1.15	1.15	1.15	1.20	1.25	1.30	1.35	1.45	1.70	1.95
1914.....	1.20	1.20	1.20	1.15	1.15	1.15	1.15	1.15	1.20	1.20	1.10	1.10
1913.....	1.50	1.50	1.50	1.50	1.50	1.45	1.45	1.45	1.40	1.35	1.30	1.20
1912.....	1.15	1.10	1.10	1.20	1.25	1.25	1.30	1.35	1.40	1.45	1.50	1.55
1911.....	1.40	1.40	1.40	1.40	1.40	1.35	1.35	1.30	1.25	1.20	1.10	1.15
1910.....	1.55	1.55	1.50	1.50	1.50	1.45	1.40	1.40	1.40	1.40	1.40	1.40
1909.....	1.60	1.45	1.30	1.20	1.25	1.30	1.35	1.40	1.50	1.50	1.55	1.60
1908.....	1.70	1.70	1.70	1.70	1.70	1.65	1.60	1.60	1.60	1.60	1.60	1.60
1907.....	1.70	1.70	1.70	1.70	1.80	1.80	1.80	1.70	1.70	1.70	1.70	1.70
1906.....	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.70
1905.....	1.45	1.50	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.60	1.60	1.60
1904.....	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.40	1.40	1.40	1.50
1903.....	1.60	1.60	1.75	1.75	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1902.....	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1901.....	1.40	1.40	1.50	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1900.....	2.40	2.20	2.00	1.80	1.60	1.35	1.05	1.10	1.05	1.05	1.35	1.40
1899.....	1.30	1.45	1.75	2.05	2.10	2.30	2.45	2.55	2.85	2.80	2.50	2.30
1898.....	1.00	1.00	0.95	1.00	1.10	1.10	1.10	1.10	1.15	1.10	1.10	1.15
1897.....	1.10	1.10	1.10	1.05	1.05	1.00	1.00	1.00	1.00	1.05	1.00	1.00
1896.....	1.40	1.35	1.30	1.35	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.10
1895.....	1.15	1.10	1.10	1.15	1.20	1.25	1.60	1.70	1.80	1.70	1.60	1.50

Structural Shapes, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	1.60c	1.60c	1.60c	1.60c	1.60c	1.60c	1.60c	1.60c	1.60c	1.70c	1.70c	1.70c
1932.....	1.55	1.50	1.55	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1931.....	1.60	1.60	1.60	1.65	1.65	1.65	1.60	1.60	1.60	1.60	1.60	1.50
1930.....	1.90	1.85	1.80	1.80	1.75	1.70	1.65	1.65	1.60	1.60	1.60	1.60
1929.....	1.90	1.90	1.90	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.90
1928.....	1.80	1.85	1.90	1.85	1.85	1.85	1.85	1.85	1.90	1.95	1.95	1.90
1927.....	1.95	1.90	1.90	1.90	1.85	1.80	1.80	1.80	1.80	1.75	1.75	1.80
1926.....	1.90	1.90	1.90	1.90	1.90	1.90	2.00	2.00	2.00	2.00	2.00	2.00
1925.....	2.10	2.10	2.10	2.00	2.00	2.00	2.00	2.00	1.90	1.90	2.00	1.95
1924.....	2.50	2.50	2.50	2.35	2.25	2.20	2.15	2.05	2.00	2.00	2.00	2.00
1923.....	2.05	2.15	2.35	2.45	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1922.....	1.50	1.40	1.45	1.50	1.60	1.65	1.70	1.80	2.00	2.00	2.00	1.95
1921.....	2.45	2.25	2.10	2.15	2.20	2.05	1.90	1.75	1.70	1.60	1.60	1.50
1920.....	2.65	3.15	3.25	3.25	3.25	3.25	3.25	3.15	3.10	3.10	3.00	2.45
1919.....	2.80	2.80	2.70	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.50
1918.....	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
1917.....	3.10	3.25	3.45	3.70	4.00	4.00	4.50	4.50	3.75	3.00	3.00	3.00
1916.....	1.85	2.05	2.40	2.50	2.50	2.50	2.50	2.50	2.60	2.70	2.90	3.00
1915.....	1.10	1.10	1.15	1.15	1.20	1.20	1.25	1.30	1.35	1.40	1.65	1.75
1914.....	1.20	1.20	1.20	1.20	1.15	1.10	1.10	1.15	1.20	1.15	1.10	1.05
1913.....	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.40	1.35	1.30	1.25
1912.....	1.15	1.15	1.15	1.20	1.25	1.25	1.30	1.35	1.40	1.45	1.50	1.55
1911.....	1.40	1.40	1.40	1.40	1.40	1.35	1.35	1.35	1.35	1.30	1.20	1.15
1910.....	1.55	1.55	1.50	1.50	1.50	1.45	1.40	1.40	1.40	1.40	1.40	1.40
1909.....	1.60	1.45	1.30	1.20	1.25	1.30	1.35	1.40	1.50	1.50	1.55	1.60
1908.....	1.70	1.70	1.70	1.70	1.70	1.65	1.65	1.60	1.60	1.60	1.60	1.60
1907.....	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
1906.....	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
1905.....	1.50	1.55	1.60	1.60	1.60	1.60	1.60	1.60	1.70	1.70	1.70	1.70
1904.....	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.40	1.40	1.40	1.40
1903.....	1.75	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1902.....	1.60	1.60	1.70	1.85	2.00	2.25	2.25	2.35	2.25	2.15	2.10	2.00
1901.....	1.50	1.50	1.50	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1900.....	2.25	2.25	2.25	2.25	2.25	2.05	1.90	1.75	1.70	1.70	1.70	1.70
1899.....	1.30	1.30	1.40	1.50	1.50	1.75	1.95	2.05	2.25	2.25	2.25	2.25
1898.....	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.20	1.20	1.20	1.20	1.20
1897.....	1.55	1.55	1.55	1.55	1.30	1.05	1.00	1.00	1.00	1.10	1.10	1.10
1896.....	1.45	1.50	1.45	1.45	1.50	1.55	1.55	1.55	1.55	1.55	1.50	1.45
1895.....	1.25	1.20	1.20	1.20	1.20	1.35	1.50	1.60	1.65	1.60	1.60	1.55

No. 24 Black Sheets, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	2.05c	2.00c	2.00c	2.00c	2.00c	2.10c	2.25c	2.25c	2.25c	2.25c	2.25c	2.25c
1932.....	2.20	2.15	2.20	2.20	2.20	2.20	2.20	2.15	2.10	2.10	2.10	2.20
1931.....	2.35	2.35	2.35	2.25	2.25	2.25	2.40	2.40	2.40	2.40	2.40	2.40
1930.....	2.70	2.65	2.65	2.65	2.55	2.55	2.55	2.50	2.40	2.40	2.35	2.35
1929.....	2.85	2.85	2.85	2.90	2.95	2.95	2.85	2.85	2.85	2.80	2.75	2.75
1928.....	2.80	2.85	2.85	2.75	2.75	2.70	2.65	2.65	2.70	2.70	2.80	2.85
1927.....	2.95	2.90	2.90	2.80	2.90	3.00	3.00	3.00	3.00	2.95	2.80	2.75
1926.....	3.35	3.35	3.25	3.25	3.20	3.10	3.10	3.10	*3.05	3.05	3.10	3.10
1925.....	3.50	3.50	3.40	3.35	3.25	3.15	3.15	3.15	3.10	3.10	3.25	3.35
1924.....	3.75	3.75	3.75	3.70	3.65	3.65	3.60	3.50	3.45	3.40	3.45	3.50
1923.....	3.35	3.35	3.55	3.85	3.85	3.85	3.85	3.85	3.75	3.75	3.75	3.75
1922.....	3.00	3.00	3.00	3.10	3.15	3.15	3.15	3.25	3.40	3.50	3.35	3.30
1921.....	4.35	4.20	3.90	3.90	4.00	3.90	3.35	3.05	2.80	3.00	2.95	3.00
1920.....	5.00	6.00	6.00	6.00	7.00	7.00	7.00	7.00	7.00	7.00	6.05	4.45
1919.....	4.70	4.70	4.60	4.35	4.35	4.30	4.30	4.35	4.35	4.35	4.35	4.35
1918.....	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
1917.....	4.55	4.55	5.05	5.75	7.00	8.15	9.00	9.00	8.75	7.75	5.30	5.00
1916.....	2.55	2.60	2.75	2.90	2.95	2.90	2.90	2.75	2.85	3.20	3.65	4.45
1915.....	1.80	1.80	1.80	1.80	1.80	1.80	1.75	1.85	1.90	2.05	2.20	2.50
1914.....	1.85	1.95	1.95	1.90	1.85	1.80	1.80	1.90	1.95	1.95	1.90	1.80
1913.....	2.30	2.35	2.35	2.35	2.35	2.30	2.25	2.20	2.10	2.00	1.95	1.90
1912.....	1.90	1.85	1.80	1.85	1.95	1.95	2.00	2.05	2.10	2.20	2.25	2.25
1911.....	2.20	2.20	2.20	2.15	2.15	2.00	2.00	1.95	1.90	1.85	1.85	1.90
1910.....	2.40	2.40	2.40	2.35	2.30	2.25	2.20	2.20	2.15	2.15	2.15	2.15
1909.....	2.40	2.40	2.30	2.20	2.20	2.20	2.20	2.20	2.20	2.30	2.40	2.40
1908.....	2.55	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1907.....	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60

*No. 28 gage before Sept. 1, 1926.

Market History—

Automobile Sheets, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	2.40c	2.45c	2.45c	2.55c	2.55c	2.55c	2.55c	2.60c	2.75c	2.75c	2.75c	2.75c
1932.....	2.90	2.85	2.85	2.80	2.80	2.80	2.80	2.70	2.75	2.65	2.60	2.60
1931.....	3.30	3.30	3.30	3.15	3.05	3.10	3.10	3.10	3.10	3.10	3.10	3.00
1930.....	3.90	3.90	3.90	3.80	3.80	3.60	3.60	3.60	3.60	3.45	3.35	3.30
1929.....	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.05	4.00	4.00
1928.....	4.00	4.10	4.15	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.05	4.10
1927.....	4.20	4.15	4.15	4.15	4.25	4.25	4.25	4.25	4.25	4.15	4.15	4.10
1926.....	4.50	4.40	4.40	4.35	4.30	4.25	4.20	4.25	*4.25	4.25	4.25	4.25
1925.....	4.75	4.70	4.55	4.45	4.35	4.30	4.25	4.25	4.25	4.35	4.45	4.50
1924.....	5.35	5.35	5.30	5.35	5.10	5.10	5.10	4.85	4.75	4.60	4.65	4.70
1923.....	4.85	4.95	5.35	5.50	5.50	5.50	5.35	5.35	5.35	5.35	5.35	5.35
1922.....	....	....	....	....	....	....	....	....	....	....	4.85	4.85

*No. 22 gage previous to September, 1926; No. 20 gage since.

No. 24 Galvanized Sheets, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	2.70c	2.50c	2.60c	2.65c	2.70c	2.70c	2.85c	2.85c	2.85c	2.85c	2.85c	2.85c
1932.....	2.80	2.75	2.80	2.85	2.85	2.85	2.85	2.80	2.75	2.80	2.85	2.85
1931.....	2.90	2.90	2.90	2.85	2.80	2.80	2.90	2.90	2.90	2.90	2.90	2.90
1930.....	3.35	3.30	3.30	3.30	3.25	3.20	3.15	3.10	3.00	3.00	2.95	2.90
1929.....	3.60	3.60	3.60	3.65	3.70	3.65	3.60	3.55	3.50	3.50	3.45	3.40
1928.....	3.65	3.65	3.75	3.65	3.65	3.55	3.50	3.50	3.50	3.50	3.55	3.60
1927.....	3.80	3.70	3.70	3.65	3.80	3.80	3.85	3.85	3.85	3.80	3.70	3.60
1926.....	4.60	4.60	4.60	4.60	4.55	4.30	4.30	4.30	*3.95	3.90	3.95	3.95
1925.....	4.75	4.75	4.70	4.55	4.35	4.20	4.20	4.20	4.20	4.25	4.50	4.60
1924.....	4.95	4.90	4.90	4.85	4.80	4.80	4.70	4.60	4.60	4.60	4.60	4.60
1923.....	4.35	4.35	4.65	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.85	4.90
1922.....	4.00	4.00	4.00	4.10	4.15	4.15	4.15	4.25	4.40	4.50	4.35	4.35
1921.....	5.70	5.50	5.05	4.90	5.00	4.90	4.35	4.05	3.80	4.00	3.95	4.00
1920.....	6.35	7.00	7.25	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.35	5.85
1919.....	6.05	6.05	5.95	5.70	5.70	5.65	5.65	5.70	5.70	5.70	5.70	5.70
1918.....	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
1917.....	6.55	6.80	6.80	7.55	8.80	9.95	10.25	10.25	9.70	8.80	6.50	6.25
1916.....	4.75	4.75	4.80	4.85	4.85	4.80	4.35	4.25	4.20	4.45	5.05	6.25
1915.....	2.75	3.00	3.40	3.30	3.40	4.45	4.55	3.95	3.65	3.50	3.90	4.75
1914.....	2.85	2.95	2.95	2.90	2.80	2.75	2.75	2.85	2.95	2.95	2.85	2.80
1913.....	3.45	3.50	3.50	3.50	3.40	3.40	3.30	3.25	3.15	3.05	2.95	2.85
1912.....	3.20	3.20	3.00	3.00	3.10	3.10	3.10	3.30	3.50	3.50	3.50	3.50
1911.....	3.20	3.20	3.20	3.20	3.20	3.00	3.00	3.00	2.80	3.00	3.00	3.20
1910.....	3.70	3.70	3.70	3.70	3.50	3.20	3.20	3.20	3.20	3.20	3.20	3.20
1909.....	3.40	3.30	3.40	3.40	3.40	3.50	3.50	3.50	3.60	3.60	3.70	3.70
1908.....	3.70	3.70	3.70	3.60	3.50	3.50	3.50	3.50	3.30	3.30	3.20	3.20
1907.....	4.00	4.00	4.00	3.80	3.80	3.80	3.70	3.70	3.60	3.60	3.50	3.50
1906.....	3.60	3.60	3.70	3.80	3.80	3.80	3.80	3.90	3.80	4.00	4.00	4.00
1905.....	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1904.....	3.50	3.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.50
1903.....	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.50	3.50	3.50

*No. 28 gage before Sept. 1, 1926.

No. 10 Blue Annealed Sheets, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	1.65c	1.60c	1.55c	1.55c	1.55c	1.65c	1.75c	1.65c	1.70c	1.75c	1.75c	1.75c
1932.....	1.75	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
1931.....	1.90	1.90	1.90	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
1930.....	2.15	2.10	2.10	2.10	2.00	2.00	2.00	1.95	1.95	1.95	1.90	1.90
1929.....	2.10	2.10	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.15
1928.....	2.10	2.10	2.10	2.05	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.10
1927.....	2.25	2.20	2.20	2.20	2.25	2.25	2.25	2.25	2.25	2.15	2.10	2.10
1926.....	2.50	2.50	2.50	2.50	2.45	2.35	2.30	2.30	2.30	2.35	2.40	2.40
1925.....	2.70	2.70	2.65	2.55	2.45	2.30	2.30	2.30	2.25	2.25	2.40	2.50
1924.....	2.95	2.90	2.95	2.80	2.80	2.80	2.75	2.70	2.70	2.60	2.60	2.70
1923.....	2.50	2.50	2.70	2.80	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.90
1922.....	2.25	2.25	2.25	2.35	2.40	2.40	2.40	2.45	2.50	2.60	2.60	2.50
1921.....	3.55	3.55	3.05	2.95	3.10	3.00	2.55	2.40	2.30	2.50	2.40	2.25
1920.....	4.05	5.50	5.50	4.85	5.00	5.00	5.00	5.00	5.00	5.00	4.95	3.65
1919.....	3.90	3.90	3.80	3.55	3.55	3.50	3.50	3.55	3.55	3.55	3.55	3.55
1918.....	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
1917.....	4.10	4.35	4.70	5.35	6.65	8.00	8.50	8.50	8.50	7.85	4.75	4.25
1916.....	2.45	2.60	2.85	3.00	3.05	3.10	3.00	3.00	2.95	3.15	3.30	3.90
1915.....	1.30	1.30	1.30	1.30	1.35	1.35	1.35	1.35	1.50	1.60	1.85	2.25
1914.....	1.35	1.40	1.40	1.40	1.35	1.35	1.35	1.35	1.40	1.40	1.40	1.35
1913.....	1.70	1.75	1.75	1.75	1.75	1.75	1.70	1.65	1.60	1.55	1.45	1.40

Tin Plate, Pittsburgh

Per Base Box, 100 lbs., Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	$4.25	$4.25	$4.25	$4.25	$4.25	$4.25	$4.25	$4.25	$4.65	$4.65	$4.65	$5.25
1932.....	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.50	4.25
1931.....	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.75	4.75	4.75
1930.....	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.00	5.00	5.00
1929.....	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35
1928.....	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.30	5.35
1927.....	5.50	5.50	5.50	5.50	5.50	5.45	5.50	5.50	5.50	5.30	5.30	5.25
1926.....	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
1925.....	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
1924.....	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
1923.....	4.75	4.75	4.95	4.95	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
1922.....	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75
1921.....	7.00	7.00	7.00	6.65	6.25	6.25	5.65	5.25	5.15	5.00	4.80	4.75
1920.....	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1919.....	7.35	7.35	7.25	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1918.....	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75
1917.....	6.90	7.00	7.50	7.50	7.90	9.25	10.00	10.00	10.00	10.00	8.20	7.75
1916.....	3.75	3.75	4.15	4.70	5.15	5.55	5.80	6.00	5.60	5.75	6.05	6.50
1915.....	3.10	3.10	3.10	3.20	3.20	3.10	3.10	3.10	3.10	3.10	3.35	3.60
1914.....	3.40	3.40	3.40	3.40	3.40	3.30	3.25	3.45	3.55	3.35	3.15	3.20
1913.....	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.55	3.50	3.40
1912.....	3.40	3.40	3.50	3.50	3.50	3.50	3.50	3.70	3.70	3.70	3.70	3.60
1911.....	3.70	3.70	3.70	3.60	3.60	3.60	3.60	3.50	3.50	3.40	3.40	3.40
1910.....	3.50	3.50	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
1909.....	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.50	3.50	3.50
1908.....	3.60	3.60	3.60	3.60	3.60	3.50	3.50	3.50	3.50	3.50	3.50	3.40
1907.....	3.90	3.90	3.90	3.90	3.80	3.80	3.70	3.70	3.70	3.60	3.60	3.60
1906.....	3.50	3.50	3.50	3.60	3.70	3.70	3.80	3.90	3.90	3.90	4.00	4.00
1905.....	3.50	3.50	3.50	3.50	3.50	3.40	3.40	3.40	3.30	3.30	3.40	3.50
1904.....	3.40	3.40	3.30	3.30	3.20	3.20	3.20	3.10	3.30	3.40	3.50	3.50
1903.....	3.80	3.80	3.90	3.90	3.80	3.80	3.70	3.70	3.60	3.60	3.60	3.50

Market History—

Cold-Rolled Strip, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	1.95c	1.80c	1.85c	1.80c	1.90c	2.00c	2.25c	2.25c	2.30c	2.40c	2.40c	2.40c
1932.....	2.00	1.90	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.95	2.00	2.00
1931.....	2.25	2.25	2.25	2.20	2.15	2.15	2.15	2.15	2.15	2.15	2.10	2.05
1930.....	2.70	2.65	2.60	2.55	2.50	2.45	2.45	2.40	2.35	2.35	2.35	2.25
1929.....	2.85	2.85	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1928.....	3.00	3.10	3.15	*2.75	2.75	2.75	2.75	2.70	2.75	2.75	2.80	2.85
1927.....	3.10	2.90	2.95	3.00	3.00	3.25	3.25	3.25	3.15	2.95	2.95	3.00
1926.....	3.90	3.90	3.90	3.85	3.75	3.70	3.65	3.50	3 50	3.50	3.25	3.25
1925.....	4.10	4.15	4.05	4.00	3.85	3.65	3.75	3.75	3.75	3.75	3.90	3.90
1924.....	5.00	4.80	4.80	4.75	4.50	4.50	4.35	4.20	4.00	4.00	4.00	4.15
1923.....	4.50	4.65	4.80	5.15	5.25	5.25	5.00	5.00	5.00	5.00	5.00	4.75
1922.....	3.50	3.50	3.50	3.60	3.70	3.95	4.00	4.00	4.25	4.50	4.50	4.50
1921.....	6.25	6.25	5.65	5.50	5.50	5.00	4.40	3.90	3.75	3.75	3.80	3.75
1920.....	5.65	7.00	8.80	8.50	8.50	8.50	8.50	8.50	7.35	8.50	8.00	6.85
1919.....	6.25	6.25	6.10	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65
1918.....	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50
1917.....	6.50	6.50	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	6.50	6.50
1916.....	4.25	4.65	5.50	6.00	6.00	6.00	6.00	6.00	6.00	6.50	6.50	6.50
1915.....	2.75	2.75	2.75	2.75	2.75	2.85	2.85	3.00	3.10	3.25	3.50	3.75
1914.....	3.05	3.05	3.05	3.05	3.05	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1913.....	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.05
1912.....	2.95	2.95	2.95	2.95	3.00	3.05	3.05	3.05	3.05	3.15	3.20	3.25
1911.....	2.95	2.95	3.25	3.25	3.25	2.95	2.95	2.95	2.95	2.95	2.95	2.95
1910.....	....	....	....	....	....	....	2.95	2.95	2.95	2.95	2.95	2.95

*April, 1928, and subsequently, prices are for 3 tons or over, instead of less than 3 tons.

Hot-Rolled Strip, Wide, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	1.45c	1.45c	1.45c	1.45c	1.55c	1.55c	1.60c	1.65c	1.70c	1.75c	1.75c	1.75c
1932.....	1.40	1.40	1.40	1.45	1.50	1.50	1.45	1.45	1.45	1.45	1.45	1.45
1931.....	1.55	1.55	1.55	1.55	1.50	1.50	1.55	1.55	1.55	1.55	1.50	1.45
1930.....	1.85	1.80	1.80	1.70	1.70	1.70	1.65	1.65	1.65	1.60	1.55	1.55
1929.....	1.80	1.85	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
1928.....	1.85	1.85	1.90	1.90	1.85	1.85	1.90	1.85	1.80	1.80	1.80	1.80
1927.....	2.20	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.00	1.90
1926.....	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
1925.....	2.35	2.40	2.35	2.20	2.20	2.20	2.20	2.20	2.20	2.25	2.30	2.30
1924.....	3.00	2.95	2.85	2.75	2.60	2.55	2.50	2.50	2.45	2.35	2.25	2.35
1923.....	2.75	2.85	3.10	3.30	3.30	3.30	3.20	3.15	3.10	3.00	3.00	2.75
1922.....	2.00	1.80	1.80	1.95	2.05	2.35	2.50	2.50	2.75	2.90	2.90	2.80
1921.....	3.30	3.30	2.85	2.75	2.75	2.70	2.50	2.30	2.15	2.15	2.25	2.00
1920.....	3.70	4.80	5.25	5.45	5.50	5.50	5.50	5.50	5.50	5.50	5.00	3.90
1919.....	3.80	3.55	3.30	3.25	3.05	3.05	3.10	3.30	3.30	3.30	*3.30	*3.30
1918.....	4.50	4.50	4.50	4.50	4.25	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917.....	....	....	....	....	....	7.25	7.25	7.25	7.00	7.00	5.25	4.50

*First quarter 1920 delivery.

Cold-Finished Steel Bars, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	1.70c	1.70c	1.70c	1.70c	1.70c	1.70c	1.70c	1.95c	1.95c	1.95c	1.95c	1.95c
1932.....	2.00	2.00	1.90	1.90	1.75	1.70	1.70	1.70	1.70	1.70	1.70	1.70
1931.....	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.00
1930.....	2.15	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.05	2.00
1929.....	2.20	2.20	2.25	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.20	2.20
1928.....	2.30	2.25	2.25	2.20	2.20	2.15	2.10	2.15	2.20	2.20	2.20	2.20
1927.....	2.35	2.35	2.40	2.40	2.40	2.35	2.30	2.30	2.20	2.15	2.10	2.10
1926.....	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.45	2.40	2.40
1925.....	2.80	2.80	2.75	2.70	2.70	2.60	2.55	2.50	2.50	2.45	2.50	2.50
1924.....	3.00	3.00	3.00	3.00	3.00	2.90	2.85	2.80	2.75	2.70	2.70	2.80
1923.....	2.50	2.65	2.85	3.00	3.25	3.25	3.25	3.25	3.25	3.25	3.00	2.90
1922.....	2.00	1.90	1.85	1.85	2.00	2.00	2.05	2.15	2.50	2.50	2.50	2.50
1921.....	3.60	3.60	3.10	3.05	3.10	3.00	2.75	2.50	2.40	2.25	2.15	2.00
1920.....	3.65	3.85	4.50	5.25	4.40	4.50	4.10	4.55	4.25	4.10	4.00	3.60

Rail Steel Bars, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	1.50c	1.45c	1.45c	1.45c	1.50c	1.50c	1.50c	1.50c	1.60c	1.70c	1.70c	1.70c
1932.....	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
1931.....	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.50	1.50	1.50
1930.....	1.85	1.85	1.85	1.85	1.80	1.75	1.75	1.65	1.65	1.65	1.65	1.65
1929.....	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.95	1.90
1928.....	1.80	1.80	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.90	1.95	2.00
1927.....	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.80	1.80	1.80
1926.....	2.00	2.00	2.00	2.00	2.00	1.90	2.00	2.00	2.00	2.00	2.00	2.00
1925.....	2.03	2.13	2.07	2.00	2.10	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1924.....	2.30	2.30	2.30	2.30	2.20	2.15	2.10	2.05	2.05	2.00	2.00	2.00
1923.....	2.00	2.00	2.25	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
1922.....	1.60	1.50	1.50	1.55	1.65	1.65	1.70	1.80	1.95	2.00	2.00	2.00
1921.....	2.50	2.50	2 50	2.15	2.00	2.00	1.95	1.85	1.85	1.75	1.70	1.65
1920.....	2.90	3.20	3.35	3.70	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
1919.....	2.80	2.80	2.80	2.55	2.45	2.45	2.45	2.55	2.55	2.55	2.75	2.85
1918.....	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Plain Wire, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	2.15c	2.10c	2.10c	2.10c	2.10c	2.10c	2.10c	2.10c	2.10c	2.10c	2.10c	2.20c
1932.....	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1931.....	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1930.....	2.40	2.40	2.40	2.40	2.35	2.30	2.30	2.30	2.30	2.30	2.30	2.25
1929.....	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.45	2.40	2.40	2.40
1928.....	2.40	2.45	2.50	2.50	2.50	2.50	2.45	2.40	2.40	2.40	2.40	2.50
1927.....	2.50	2.45	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
1926.....	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1925.....	2.60	2.60	2.60	2.55	2.60	2.45	2.50	2.50	2.50	2.50	2.50	2.50
1924.....	2.75	2.75	2.75	2.75	2.70	2.65	2.60	2.60	2.55	2.50	2.50	2.60
1923.....	2.45	2.60	2.65	2.70	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1922.....	2.25	2.20	2.25	2.25	2.25	2.25	2.25	2.25	2.40	2.45	2.45	2.45
1921.....	3.25	3.20	3.00	3.00	3.00	2.75	2.50	2.50	2.60	2.60	2.60	2.25
1920.....	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.20	3.25	3.25	3.25
1919.....	3.25	3.25	3.20	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.15	3.25
1918.....	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1917.....	2.95	2.95	3.10	3.20	3.45	3.60	3.95	3.95	3.95	3.85	3.25	3.25
1916.....	1.95	2.10	2.25	2.25	2.45	2.45	2.45	2.55	2.55	2.60	2.80	2.95
1915.....	1.30	1.35	1.40	1.40	1.35	1.35	1.40	1.40	1.55	1.60	1.70	1.90
1914.....	1.35	1.40	1.40	1.40	1.35	1.30	1.30	1.35	1.35	1.40	1.40	1.30
1913.....	1.55	1.55	1.55	1.60	1.60	1.60	1.50	1.45	1.45	1.40	1.40	1.35
1912.....	1.35	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.50	1.55	1.55	1.55

Market History—

Wire Nails, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	ov.	Dec.
1933.....	$1.90	$1.85	$1.85	$1.85	$1.85	$1.85	$2.05	$2.10	$2.10	$2.10	$2.10	$2.35
1932.....	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95
1931.....	1.90	1.90	1.90	1.90	1.90	1.80	1.85	1.90	1.90	1.90	1.90	1.90
1930.....	2.39	2.30	2.30	2.25	2.15	2.15	2.10	2.05	2.00	2.00	1.95	1.90
1929.....	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.50	2.45	2.40	2.40
1928.....	2.50	2.60	2.65	2.60	2.60	2.60	2.55	2.55	2.55	2.55	2.55	2.65
1927.....	2.65	2.60	2.55	2.55	2.50	2.55	2.55	2.55	2.55	2.55	2.50	2.50
1926.....	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65
1925.....	2.85	2.85	2.85	2.20	2.25	2.75	2.65	2.65	2.65	2.65	2.65	2.65
1924.....	3.00	3.00	3.00	3.00	2.95	2.90	2.85	2.85	2.80	2.75	2.75	2.85
1923.....	2.70	2.75	2.90	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
1922.....	2.50	2.45	2.40	2.40	2.40	2.40	2.40	2.40	2.65	2.70	2.70	2.70
1921.....	3.25	3.00	3.00	3.25	3.25	3.00	2.75	2.75	2.90	2.90	2.90	2.50
1920.....	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1919.....	3.50	3.50	3.45	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.45	3.50
1918.....	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917.....	3.00	3.00	3.15	3.20	3.50	3.65	4.00	4.00	4.00	3.90	3.50	3.50
1916.....	2.15	2.20	2.40	2.40	2.50	2.50	2.50	2.60	2.60	2.65	2.85	3.00
1915.....	1.50	1.55	1.60	1.60	1.55	1.55	1.60	1.60	1.70	1.75	1.85	2.00
1914.....	1.55	1.60	1.60	1.60	1.60	1.55	1.55	1.55	1.60	1.60	1.60	1.50
1913.....	1.75	1.75	1.75	1.80	1.80	1.80	1.75	1.70	1.65	1.60	1.60	1.60
1912.....	1.55	1.60	1.60	1.60	1.60	1.60	1.60	1.65	1.70	1.70	1.75	1.75
1911.....	1.70	1.75	1.80	1.80	1.75	1.80	1.70	1.70	1.65	1.65	1.55	1.55
1910.....	1.85	1.85	1.85	1.85	1.80	1.80	1.70	1.70	1.70	1.70	1.65	1.70
1909.....	1.95	1.95	1.95	1.95	1.60	1.70	1.70	1.80	1.80	1.80	1.80	1.85
1908.....	2.05	2.05	2.05	2.05	2.05	2.00	1.95	1.95	1.95	1.95	1.95	1.95
1907.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.05	2.05	2.05	2.05

Bar Iron, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933.....	1.65c	1.65c	1.65c	1.65c	1.65c	1.65c	1.65c	1.65c	*1.60c	1.60c	1.60c	1.60c
1932.....	1.60	1.70	1.70	1.70	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
1931.....	1.70	1.75	1.70	1.80	1.80	1.70	1.70	1.70	1.70	1.70	1.65	1.60
1930.....	2.00	1.95	1.95	1.95	1.90	1.90	1.90	1.80	1.75	1.75	1.70	1.70
1929.....	2.00	2.05	2.00	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.00	2.00
1928.....	1.90	1.95	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1927.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.90	1.85	1.90
1926.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1925.....	2.00	2.00	2.10	2.10	2.10	2.05	1.95	1.90	1.90	1.90	2.00	2.00
1924.....	2.40	2.40	2.40	2.35	2.30	2.25	2.20	2.15	2.15	2.10	2.10	2.00
1923.....	2.35	2.45	2.55	2.60	2.60	2.60	2.55	2.50	2.40	2.40	2.40	2.40
1922.....	1.60	1.60	1.60	1.65	1.65	1.75	1.80	2.00	2.25	2.50	2.50	2.35
1921.....	2.75	2.65	2.65	2.50	2.45	2.25	1.95	1.75	1.75	1.75	1.70	1.65
1920.....	3.15	3.45	3.50	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.50
1919.....	3.15	2.95	2.85	2.55	2.50	2.55	2.65	2.65	2.65	2.70	2.75	2.75
1918.....	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917.....	3.00	3.00	3.00	3.20	3.40	4.00	4.50	4.50	4.50	4.50	4.00	4.00
1916.....	1.85	1.90	2.20	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.50	2.60
1915.....	0.95	1.05	1.10	1.15	1.15	1.15	1.20	1.25	1.30	1.35	1.50	1.70
1914.....	1.15	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.05	1.05	0.95	0.95
1913.....	1.60	1.60	1.60	1.55	1.55	1.55	1.50	1.45	1.35	1.25	1.15	1.15
1912.....	1.15	1.15	1.15	1.15	1.25	1.25	1.35	1.40	1.45	1.50	1.55	1.55
1911.....	1.30	1.30	1.25	1.20	1.20	1.20	1.20	1.20	1.20	1.15	1.15	1.15
1910.....	1.60	1.60	1.55	1.55	1.50	1.45	1.40	1.40	1.40	1.35	1.35	1.30
1909.....	1.50	1.50	1.40	1.30	1.25	1.30	1.35	1.40	1.50	1.50	1.55	1.60
1908.....	1.60	1.55	1.55	1.55	1.55	1.55	1.50	1.50	1.50	1.50	1.50	1.50
1907.....	1.80	1.80	1.80	1.80	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75

*Beginning September, Terre Haute, Ind., base quoted; freight to Chicago, 18 cents.

Hoops, Pittsburgh

Now quoted as hot-rolled strip

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1928.....	2.10	2.15	2.20	2.15	2.15	2.10	2.10	2.05	2.10	2.10	2.00	2.00
1927.....	2.40	2.25	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.25	2.20	2.15
1926.....	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1925.....	2.45	2.45	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.45	2.50	2.50
1924.....	3.00	3.00	2.85	2.75	2.75	2.70	2.60	2.60	2.55	2.50	2.50	2.50
1923.....	2.75	2.85	3.10	3.30	3.30	3.30	3.15	3.15	3.15	3.15	3.00	2.90
1922.....	1.95	1.85	1.80	1.95	2.05	2.35	2.45	2.55	2.75	2.90	2.90	2.80
1921.....	3.05	3.05	2.70	2.75	2.75	2.70	2.45	2.40	2.30	2.25	2.20	2.15
1920.....	3.05	3.05	3.50	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05
1919.....	3.30	3.30	3.25	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05
1918.....	3.50	3.50	3.05	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917.....	3.50	3.50	3.90	4.10	4.70	5.75	6.00	6.00	6.00	6.00	4.60	3.50
1916.....	2.00	2.25	2.55	2.75	2.75	2.75	2.75	2.80	3.00	3.00	3.25	3.25
1915.....	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.30	1.40	1.50	1.75	1.95
1914.....	1.40	1.30	1.30	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
1913.....	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.50	1.40
1912.....	1.30	1.25	1.25	1.25	1.25	1.25	1.35	1.40	1.40	1.45	1.50	1.50
1911.....	1.50	1.50	1.45	1.45	1.45	1.45	1.40	1.40	1.35	1.35	1.30	1.30
1910.....	1.60	1.60	1.60	1.60	1.50	1.55	1.55	1.55	1.50	1.50	1.50	1.50
1909.....	1.80	1.75	1.60	1.60	1.50	1.40	1.40	1.40	1.50	1.50	1.50	1.55
1908.....	2.00	2.00	2.00	2.00	2.00	1.90	1.80	1.80	1.80	1.80	1.80	1.80

Bands, Pittsburgh

Now quoted as hot-rolled strip

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1928.....	2.10	2.10	2.10	2.05	2.00	2.00	2.00	1.95	1.95	2.00	1.90	1.90
1927.....	2.40	2.25	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.25	2.20	2.15
1926.....	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1925.....	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.45	2.50	2.50
1924.....	3.00	3.00	2.85	2.75	2.75	2.70	2.60	2.60	2.40	2.40	2.40	2.40
1923.....	2.75	2.85	3.10	3.30	3.30	3.30	3.15	3.15	3.15	3.15	3.00	2.90
1922.....	1.75	1.75	1.70	1.85	2.05	2.35	2.45	2.55	2.75	2.90	2.90	2.80
1921.....	3.05	3.05	2.70	2.75	2.75	2.70	2.35	2.20	2.20	2.25	2.15	2.00
1920.....	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05
1919.....	3.30	3.30	3.25	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05
1918.....	2.90	2.90	2.90	2.90	3.00	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917.....	3.00	3.00	3.35	3.35	3.60	5.50	6.00	6.00	6.00	6.00	4.30	2.98
1916.....	1.85	2.05	2.35	2.50	2.50	2.50	2.50	2.60	2.60	2.60	2.75	2.90

Market History—

Angle Bars, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933	2.55c	2.55c	2.55c	2.55c	2.55c	2.55c	2.55c	2.55c	2.55c	2.55c	2.55c	2.55c
1932	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.65	2.65
1931	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1930	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1929	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1928	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1927	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1926	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1925	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1924	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1923	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1922	2.45	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.50	2.75	2.75	2.55
1921	2.75	2.75	2.75	2.70	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1920	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1919	3.00	3.00	3.00	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1918	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.15
1917	2.25	2.25	2.35	2.75	2.95	3.25	3.45	3.25	3.25	3.25	3.25	3.25
1916	1.50	1.50	1.50	1.50	1.90	2.00	2.00	2.00	2.00	2.15	2.25	2.25
1915	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
1914	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50

Tie Plates, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933	1.75c	1.75c	1.75c	1.75c	1.75c	1.75c	1.80c	1.80c	1.80c	1.80c	1.80c	1.80c
1932	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.75	1.75	1.75
1931	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.90
1930	2.10	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.00	1.95
1929	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15
1928	2.25	2.25	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15
1927	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.25	2.25
1926	2.30	2.25	2.25	2.25	2.25	2.25	2.25	2.30	2.35	2.35	2.35	2.35
1925	2.35	2.45	2.45	2.40	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35
1924	2.60	2.60	2.60	2.60	2.60	2.60	2.55	2.45	2.45	2.35	2.35	2.35
1923	2.40	2.45	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
1922	1.90	1.85	1.75	1.80	1.85	1.85	1.85	2.00	2.20	2.35	2.35	2.35
1921	3.00	3.00	3.00	2.75	2.50	2.50	2.40	2.15	2.00	2.00	2.00	1.90
1920	2.75	2.75	2.75	2.75	2.75	2.75	2.80	3.00	3.00	3.00	3.00	3.00
1919	3.00	3.00	3.00	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1918	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1917	2.75	2.75	2.90	3.00	3.00	3.00	3.40	3.50	3.50	3.50	3.50	3.45
1916	1.80	2.05	2.25	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.75
1915	.....	.....	.....	.....	.....	.....	.....	.....	1.50	1.50	1.70	1.80

Track Bolts, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933	3.50c	3.50c	3.50c	3.50c	3.50c	3.50c	3.50c	3.40c	3.40c	3.40c	3.45c	3.45c
1932	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1931	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.70
1930	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80
1929	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80
1928	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80
1927	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.80	3.80	3.80
1926	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90
1925	3.90	4.00	4.00	4.00	3.95	3.90	3.90	3.90	3.90	3.90	3.90	3.90
1924	4.10	4.10	4.10	4.10	4.10	4.10	3.90	3.80	3.80	3.80	3.80	3.80
1923	3.90	4.05	4.15	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
1922	3.60	3.50	3.50	3.60	3.90	3.90	3.60	3.60	3.80	3.85	3.85	3.85
1921	5.00	5.00	5.00	4.85	4.75	4.45	4.40	4.15	3.65	3.65	3.65	3.60
1920	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.75	4.95	5.00	5.00	5.00
1919	4.90	4.90	4.90	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60
1918	4.90	4.85	5.05	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10
1917	4.25	4.50	4.50	4.55	5.00	5.05	5.55	5.25	5.25	5.25	5.25	5.15
1916	2.60	2.65	3.20	3.25	3.25	3.25	3.25	3.25	3.25	3.60	4.20	4.25
1915	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.10	2.10	2.35	2.50
1914	2.05	2.00	2.00	2.00	2 00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Railroad Spikes, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933	2.40c	2.40c	2.25c	2.25c	2.15c	2.15c	2.40c	2.40c	2.40c	2.40c	2.40c	2.40c
1932	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.40	2.40	2.40
1931	2.80	2.80	2.80	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.65
1930	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
1929	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
1928	2.70	2.75	2.75	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
1927	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
1926	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.75	2.80	2.80	2.80	2.80
1925	2.90	2.90	2.85	2.80	2.80	2.80	2.80	2.75	2.75	2.80	2.80	2.80
1924	3.05	3.05	3.05	3.00	2.95	2.90	2.80	2.80	2.75	2.70	2.75	2.80
1923	2.85	2.90	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.05
1922	2.25	2.15	2.05	2.20	2.25	2.30	2.25	2.30	2.80	2.80	2.75	2.75
1921	3.65	3.65	3.30	3.30	3.25	3.25	3.00	2.75	2.45	2.35	2.30	2.25
1920	3.45	3.70	3.95	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	2.75
1919	3.65	3.65	3.55	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35
1918	4.00	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90
1917	3.40	3.40	3.50	3.65	3.90	4.20	4.70	6.20	6.50	6.15	5.00	4.75
1916	2.15	2.25	2.50	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	3.25

Structural Rivets, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933	2.25c	2.25c	2.25c	2.25c	2.25c	2.35c	2.50c	2.50c	2.50c	2.60c	2.75c	2.75c
1932	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
1931	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.55	2.30	2.25	2.25
1930	3.10	3.10	3.10	3.10	3.00	2.90	2.90	2.75	2.75	2.75	2.75	2.75
1929	2.85	2.90	2.95	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10
1928	2.75	2.75	2.80	2.90	2.90	2.90	2.90	2.85	2.80	2.80	2.80	2.80
1927	2.35	2.30	2.30	2.75	2.75	2.75	2.75	2.85	2.85	2.75	2.75	2.75
1926	2.55	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1925	2.60	2.55	2.50	2.50	2.45	2.40	2.45	2.40	2.40	2.40	2.60	2.60
1924	2.85	2.75	2.75	2.65	2.60	2.55	2.50	2.50	2.55	2.60	2.60	2.60
1923	3.00	3.00	3.25	3.25	3.25	3.25	3.15	3.00	3.00	3.00	2.75	2.90
1922	2.25	2.00	2.00	2.05	2.20	2.35	2.40	2.45	3.00	3.00	3.00	3.00
1921	4.15	3.90	3.70	3.60	3.30	3.00	2.70	2.35	2.30	2.40	2.30	2.30
1920	4.15	4.40	4.50	4.50	4.50	4.50	4.50	4.50	4.60	4.75	4.75	4.50
1919	4.40	4.20	4.20	3.70	3.70	3.70	3.70	3.90	3.90	3.90	4.00	4.05
1918	4.65	4.65	4.65	4.65	4.60	4.40	4.40	4.40	4.40	4.40	4.40	4.40
1917	4.25	4.25	4.50	4.75	5.05	5.25	5.25	5.25	5.25	5.25	5.00	4.65
1916	2.60	2.75	3.10	3.35	3.90	4.25	4.05	4.00	4.00	4.00	4.10	4.25
1915	1.45	1.45	1.45	1.45	1.45	1.50	1.50	1.50	1.60	1.75	2.30	2.45
1914	1.60	1.60	1.60	1.60	1.60	1.55	1.50	1.50	1.55	1.50	1.45	1.45
1913	2.20	2.20	2.20	2.20	2.15	2.15	2.10	2.00	2.00	1.90	1.80	1.75

Market History—

Cast Iron Pipe, New York

6-inch and larger

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933	$32.00	$32.00	$32.00	$32.00	$32.00	$32.00	$32.00	$32.00	$34.00	$34.50	$38.60	$40.00
1932	28.00	28.00	28.00	28.00	28.00	26.50	26.00	30.00	32.00	32.00	32.00	32.00
1931	38.10	37.50	37.50	37.50	35.75	34.50	33.70	32.00	28.50	29.10	29.00	28.00
1930	36.90	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50
1929	38.85	39.80	39.80	39.05	38.20	38.00	37.90	37.50	37.50	37.50	36.75	36.50
1928	37.15	36.75	36.75	37.25	37.65	38.25	38.08	37.60	37.60	37.10	37.20	38.60
1927	49.50	49.50	49.50	49.50	48.60	47.95	46.00	44.00	38.25	36.90	37.25	37.25
1926	51.50	51.50	51.50	52.75	51.50	51.50	51.50	51.50	51.50	51.50	51.50	51.50
1925	61.05	61.05	60.05	58.15	58.05	57.05	57.05	57.05	56.50	57.05	57.05	57.05
1924	66.10	66.10	66.10	66.10	66.10	65.10	65.10	64.10	64.10	64.10	62.10	60.60
1923	56.50	57.30	58.40	58.70	59.00	59.00	59.00	59.20	63.60	63.60	62.80	66.60
1922	47.30	47.30	47.60	48.80	48.80	49.80	53.30	54.50	55.30	55.30	55.30	55.30
1921	63.30	63.30	63.30	63.30	61.30	52.70	48.55	47.05	45.30	47.55	47.30	47.30
1920	67.30	70.30	71.30	73.30	76.30	76.30	76.30	76.30	77.20	77.20	77.20	77.20
1919	66.20	62.70	61.65	57.70	56.70	52.70	52.70	53.10	54.30	56.70	58.30	61.30
1918	55.35	55.35	55.35	55.35	56.55	61.35	62.30	62.50	62.70	67.50	67.70	67.70
1917	41.50	41.50	41.90	51.25	55.50	60.75	65.50	65.50	65.50	56.50	56.10	54.75
1916	29.00	29.40	29.50	30.50	30.50	30.50	30.50	30.50	30.50	30.50	34.50	41.00
1915	20.00	20.00	20.25	20.50	20.50	20.50	21.75	22.15	23.40	24.00	25.00	26.40

Cast Iron Pipe, Chicago

6-inch and larger

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933	$40.40	$40.40	$40.40	$40.40	$40.40	$42.65	$43.40	$43.40	$43.40	$43.00	$43.25	$44.00
1932	40.40	38.80	38.40	34.40	34.40	34.40	34.40	34.40	38.90	40.40	40.40	40.00
1931	45.20	45.20	43.70	42.10	42.00	42.00	42.00	39.00	40.00	40.00	40.00	40.00
1930	44.40	45.20	45.20	45.20	44.00	43.20	44.80	45.20	45.20	45.20	45.20	45.20
1929	45.20	45.20	45.20	45.20	45.20	45.20	45.20	45.20	45.20	45.20	45.20	45.20
1928	36.20	36.20	36.70	38.20	39.00	39.00	41.45	42.00	42.20	42.70	45.00	45.20
1927	45.70	43.70	44.00	44.20	43.20	42.80	42.20	38.95	36.20	34.30	35.30	35.30
1926	48.70	49.20	49.20	49.20	49.45	48.95	47.45	47.45	47.80	47.20	47.20	47.20
1925	49.00	50.20	48.20	46.10	46.95	47.95	48.20	49.20	49.45	49.20	50.20	50.20
1924	56.00	57.20	57.20	56.95	55.40	55.20	52.20	52.70	52.20	50.00	48.00	47.00
1923	51.20	53.20	53.70	55.20	57.20	57.20	59.20	60.45	59.20	57.95	56.85	59.20
1922	41.60	42.10	43.00	43.85	44.70	46.60	45.55	45.20	47.85	52.20	51.20	51.20
1921	64.10	64.10	64.10	64.10	64.10	51.50	47.60	44.35	42.90	42.60	42.60	42.60
1920	67.55	71.30	72.80	74.40	76.80	76.80	76.80	76.80	81.50	83.10	83.10	83.10
1919	54.30	61.80	60.55	56.80	54.80	51.80	52.60	54.80	55.80	59.80	59.80	63.80
1918	54.30	54.30	54.30	54.30	55.50	60.80	62.05	61.85	61.80	66.80	66.80	66.80
1917	41.00	41.50	43.70	52.50	55.50	60.75	65.50	65.50	65.50	57.75	52.10	53.50
1916	29.20	29.50	29.50	30.50	30.50	30.50	30.50	30.50	31.00	31.50	35.00	40.50
1915	23.40	23.00	23.00	23.00	23.00	23.00	24.00	24.00	24.70	25.75	26.90	27.90

Cast Iron Pipe, Birmingham

6-inch and larger

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933	$32.00	$32.00	$32.00	$32.00	$32.00	$34.25	$35.00	$35.00	$35.00	$35.00	$35.25	$36.00
1932	33.00	32.20	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00
1931	37.00	37.00	36.50	35.00	35.00	35.00	35.00	35.00	33.00	33.00	33.00	33.00
1930	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00
1929	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00
1928	29.00	29.00	28.50	30.00	33.50	31.00	32.50	34.00	34.00	35.00	36.40	37.00
1927	36.00	36.00	36.50	36.00	36.50	34.80	34.00	30.75	29.80	28.75	29.00	29.00
1926	42.00	41.25	40.24	40.00	50.00	40.00	40.00	40.00	39.40	40.00	39.00	38.00
1925	40.00	40.00	40.00	39.60	38.50	40.00	40.00	41.00	41.00	41.75	42.00	42.00
1924	46.80	47.50	48.00	48.00	48.00	48.00	47.00	47.00	45.00	44.40	46.00	40.00
1923	43.00	45.00	45.50	46.75	49.00	49.00	49.00	49.00	49.00	49.00	49.00	51.00
1922	35.00	34.00	33.00	34.15	34.70	37.00	37.00	37.30	40.00	43.00	43.00	43.00
1921	55.00	55.00	55.00	55.00	55.00	42.50	40.00	39.50	38.00	36.50	32.50	35.00
1920	60.00	64.50	66.00	67.00	70.00	70.00	70.00	70.00	72.40	74.00	74.00	74.00
1919	58.75	55.00	54.50	53.00	52.00	48.00	48.00	48.00	48.00	50.00	53.00	56.70
1918	49.00	49.00	49.00	49.00	50.20	55.00	55.00	55.00	55.00	60.00	60.00	60.05
1917	36.00	36.00	37.40	42.40	47.20	55.00	55.00	55.00	55.75	47.25	45.00	46.00
1916	24.00	24.50	25.00	25.00	25.00	25.00	25.00	25.50	25.50	25.50	28.40	35.00
1915	19.50	19.50	19.50	19.50	19.25	18.65	19.00	19.00	19.40	20.75	21.90	22.65

Steel Ingot Production

Compiled by American Iron and Steel Institute

Gross Tons

	1924		1925		1926		†1927		†1928	
	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.
January	3,649,913	135,182	4,193,281	155,307	4,132,210	158,931	3,789,874	145,764	3,990,902	153,496
February	3,826,246	153,050	3,752,352	156,348	3,785,051	157,710	3,812,046	158,835	4,043,457	161,738
March	4,206,699	161,796	4,194,340	161,321	4,468,617	165,504	4,535,272	167,973	4,507,217	166,934
April	3,348,466	128,787	3,583,676	137,834	4,105,799	157,915	4,127,335	158,744	4,305,382	172,215
May	2,640,034	97,779	3,454,971	132,883	3,927,979	151,076	4,047,251	155,663	4,207,212	155,823
June	2,065,676	82,627	3,204,451	123,248	3,734,153	143,621	3,495,609	134,446	3,743,903	143,996
July	1,877,789	72,223	3,084,472	118,634	3,634,993	139,807	3,204,135	128,165	3,805,598	152,224
August	2,552,891	98,188	3,420,998	131,577	3,986,966	153,345	3,498,549	129,576	4,178,610	154,763
September	2,827,625	108,755	3,489,565	134,214	6,913,383	150,515	3,268,881	125,726	4,147,893	165,916
October	3,125,418	115,756	3,888,814	144,030	4,074,544	156,713	3,316,292	127,550	4,649,968	172,221
November	3,121,149	124,846	3,902,900	156,116	3,705,744	142,529	3,127,015	120,270	4,266,835	164,109
December	3,569,251	137,279	3,970,918	152,728	3,466,766	133,337	3,175,484	122,134	4,018,208	160,728
Total	36,811,157	*117,984	44,140,738	*141,932	46,936,205	*150,920	43,397,743	*139,543	49,865,185	*160,338

	†1929		†1930		†1931		†1932		†1933	
	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.
January	4,500,131	166,672	3,778,235	139,935	2,512,140	93,042	1,484,991	57,115	1,030,075	39,618
February	4,328,713	180,363	4,035,111	168,130	2,547,027	106,126	1,481,253	59,250	1,086,867	45,286
March	5,068,176	194,930	4,254,331	163,628	3,054,339	117,475	1,433,337	53,087	909,886	33,699
April	4,950,053	190,387	4,109,492	158,057	2,766,959	106,421	1,259,629	48,447	1,362,856	54,514
May	5,286,246	195,787	3,982,915	147,515	2,551,633	98,140	1,125,243	43,279	2,001,991	74,148
June	4,902,955	196,118	3,418,535	136,741	2,127,762	81,837	912,757	35,106	2,597,517	99,904
July	4,850,583	186,561	2,922,220	112,393	1,887,580	72,599	806,722	32,269	3,203,810	128,152
August	4,939,086	182,929	3,060,763	117,722	1,716,829	66,032	846,730	31,360	2,900,611	107,430
September	4,527,887	181,115	2,840,379	109,245	1,545,411	59,439	991,858	38,148	2,310,982	88,884
October	4,534,326	167,938	2,692,539	99,724	1,590,180	58,896	1,087,058	41,810	2,111,842	81,225
November	3,521,111	135,427	2,212,220	88,489	1,591,644	63,666	1,032,221	39,701	1,540,882	59,265
December	2,903,012	116,120	1,979,547	76,136	1,301,211	50,047	861,034	33,117	.....	.....
Total	54,312,279	*174,638	39,286,287	*126,322	25,192,715	*81,006	13,322,833	*42,701	‡21,057,319	*73,885

*Average. †Beginning with 1927, the Institute excludes crucible and electric ingots, which totaled 675,123 tons in 1927, 810,029 tons in 1928, 958,076 tons in 1929, 614,852 tons in 1930, 412,489 tons in 1931 and 241,756 in 1932. ‡Eleven months.

Pig Iron Production

IN GROSS TONS

Annual Statistics of Coke and Anthracite Pig Iron Compiled by American Iron and Steel Institute, Monthly Statistics, 1913 to date, by STEEL (Iron Trade Review prior to July 1, 1930)

Year	Tons	Year	Tons	Year	Tons	Year	Tons
1857....	417,711	1871....	1,363,043	1885....	3,687,522	1899....	13,335,937
1858....	374,804	1872....	2,101,760	1886....	5,273,010	1900....	13,404,760
1859....	496,952	1873....	2,045,231	1887....	5,900,914	1901....	15,494,913
1860....	572,713	1874....	1,886,479	1888....	5,955,105	1902....	17,431,138
1861....	478,809	1875....	1,656,777	1889....	7,028,374	1903....	17,503,568
1862....	536,609	1876....	1,593,382	1890....	8,574,558	1904....	16,157,504
1863....	656,785	1877....	1,782,805	1891....	7,702,906	1905....	22,639,452
1864....	798,342	1878....	2,039,252	1892....	8,619,379	1906....	24,874,184
1865....	597,536	1879....	2,151,431	1893....	6,737,713	1907....	25,343,964
1866....	918,717	1880....	3,355,228	1894....	6,434,966	1908....	15,686,872
1867....	997,576	1881....	3,573,863	1895....	9,220,967	1909....	25,419,468
1868....	1,100,893	1882....	4,000,193	1896....	8,311,833	1910....	26,907,060
1869....	1,361,153	1883....	4,085,041	1897....	9,397,469	1911....	23,370,871
1870....	1,339,284	1884....	3,670,567	1898....	11,477,184	1912....	29,379,912

	—Stacks— No.	In	——Output—— Total	Av. Daily
1913				
January	423	297	2,787,800	89,929
February	423	306	2,578,670	92,095
March	423	278	2,762,823	89,123
April	421	297	2,754,353	91,812
May	421	285	2,816,825	90,865
June	422	283	2,616,883	87,229
July	422	264	2,558,275	82,525
August	424	260	2,537,018	81,839
September	425	258	2,494,098	83,137
October	425	244	2,539,924	81,933
November	424	225	2,229,960	74,322
December	424	191	1,976,138	63,746
Total			30,652,767	*83,980

	—Stacks— No.	In	——Output—— Total	Av. Daily
1914				
January	423	199	1,879,336	60,624
February	423	219	1,888,607	67,450
March	423	232	2,341,551	75,534
April	422	212	2,261,501	75,383
May	422	198	2,097,019	67,646
June	422	193	1,904,566	63,486
July	422	187	1,955,324	63,075
August	422	187	1,996,483	64,403
September	422	180	1,882,718	62,757
October	422	162	1,767,227	57,007
November	421	150	1,501,269	50,042
December	421	154	1,495,325	48,236
Total			22,970,926	*62,934

	—Stacks— No.	In	——Output—— Total	Av. Daily
1915				
January	421	165	1,591,024	51,323
February	421	179	1,666,592	59,521
March	421	190	2,046,280	66,009
April	421	197	2,114,518	70,484
May	421	207	2,255,157	72,747
June	421	221	2,369,932	78,998
July	421	234	2,563,311	82,687
August	421	246	2,774,825	89,510
September	420	266	2,834,342	94,478
October	420	276	3,120,340	100,656
November	420	285	3,035,235	101,174
December	421	295	3,201,605	103,278
Total			29,573,161	*81,022

	—Stacks— No.	In	——Output—— Total	Av. Daily
1916				
January	421	304	3,171,878	102,319
February	421	312	3,078,548	106,157
March	422	315	3,327,630	107,343
April	422	320	3,225,496	107,517
May	423	321	3,364,584	108,535
June	423	325	3,213,818	107,127
July	419	316	3,221,127	103,907
August	419	317	3,197,838	103,156
September	419	326	3,208,041	106,935
October	419	328	3,508,180	113,167
November	420	322	3,317,805	110,593
December	422	309	3,184,178	102,715
Total			39,019,123	*106,609

	—Stacks— No.	In	——Output—— Total	Av. Daily
1917				
January	422	310	3,159,839	101,930
February	422	317	2,649,935	94,641
March	423	331	3,255,813	105,026
April	425	333	3,328,061	110,936
May	425	340	3,413,677	110,119
June	427	347	3,260,234	108,675
July	429	351	3,337,442	107,659
August	431	357	3,238,970	104,483
September	431	342	3,140,742	104,691
October	433	354	3,296,286	106,332
November	434	344	3,198,597	106,620
December	435	321	2,885,380	93,077
Total			38,164,976	*104,561

	—Stacks— No.	In	——Output—— Total	Av. Daily
1918				
January	435	294	2,403,227	77,523
February	435	319	2,318,242	82,723
March	438	338	3,209,996	103,548
April	437	351	3,273,355	109,112
May	437	360	3,451,884	111,351
June	437	353	3,316,148	110,538
July	437	364	3,408,584	109,954
August	438	371	3,378,479	108,983
September	438	364	3,413,223	113,774
October	437	364	3,482,392	112,335
November	437	360	3,347,844	111,595
December	435	351	3,434,114	110,778
Total			38,437,488	*105,308

	—Stacks— No.	In	——Output—— Total	Av. Daily
1919				
January	435	330	3,306,279	106,654
February	435	311	2,943 347	105,120
March	435	279	3,088,023	99,614
April	435	216	2,474,374	82,479
May	433	197	2,107,729	67,991
June	433	199	2,114,028	70,467
July	434	240	2,424,212	78,200
August	432	266	2,742,081	88,453
September	433	163	2,480,790	82,692
October	432	216	1,864,424	60,142
November	432	252	2,407,369	80,244
December	432	262	2,626,074	84,711
Total			30,578,730	*83,777

	—Stacks— No.	In	——Output—— Total	Av. Daily
1920				
January	432	285	3,012,373	97,172
February	432	305	2,984,257	102,904
March	433	315	3,375,768	108,895
April	433	278	2,752,670	91,754
May	433	297	2,991,825	96,510
June	433	302	3,046,623	101,553
July	434	291	3,043,918	98,190
August	434	306	3,145,536	101,468
September	434	317	3,124,308	104,143
October	435	290	3,288,341	106,075
November	435	255	2,935,081	97,836
December	435	202	2,700,268	87,105
Total			36,400,968	*99,456

	—Stacks— No.	In	——Output—— Total	Av. Daily
1921				
January	436	184	2,414,753	77,895
February	436	155	1,929,394	68,906
March	436	103	1,594,866	51,447
April	436	96	1,190,751	39,691
May	436	90	1,215,272	39,202
June	436	74	1,064,007	35,466
July	435	69	864,642	27,892
August	436	69	954,901	30,802
September	435	84	985,795	32,859
October	435	95	1,234,450	39,821
November	429	120	1,414,958	47,165
December	429	123	1,642,775	52,992
Total			16,506,564	*45,223

	—Stacks— No.	In	——Output—— Total	Av. Daily
1922				
January	430	127	1,645,804	53,090
February	429	139	1,630,180	58,220
March	429	155	2,035,908	65,674
April	429	161	2,070,161	69,005
May	427	175	2,309,348	74,495
June	427	191	2,362,455	78,748
July	427	170	2,403,030	77,517
August	427	143	1,810,665	58,408
September	427	189	2,024,008	67,466
October	428	218	2,629,655	84,827
November	428	241	2,846,110	94,870
December	428	253	3,083,520	99,468
Total			26,850,844	*73,563

	—Stacks— No.	In	——Output—— Total	Av. Daily
1923				
January	428	261	3,228,226	104,136
February	424	278	2,993,918	106,925
March	424	295	3,523,595	113,664
April	423	311	3,546,308	118,210
May	423	322	3,868,486	124,790
June	424	322	3,667,868	122,262
July	418	299	3,684,677	118,860
August	418	270	3,448,886	111,254
September	418	254	3,117,526	103,917
October	418	245	3,142,646	101,375
November	418	229	2,891,191	96,373
December	418	231	2,912,527	93,952
Total			40,025,850	*109,659

	—Stacks— No.	In	——Output—— Total	Av. Daily
1924				
January	414	248	3,015,480	97,273
February	414	263	3,073,619	105,987
March	410	269	3,465,389	111,787
April	410	234	3,226,107	107,537
May	411	187	2,619,986	84,515
June	411	158	2,022,836	67,427
July	411	145	1,783,457	57,531
August	411	150	1,882,986	60,741
September	411	174	2,053,617	68,454
October	411	182	2,461,727	79,410
November	411	204	2,514,979	83,832
December	411	229	2,956,389	95,367
Total			31,076,572	*84,908

	—Stacks— No.	In	——Output—— Total	Av. Daily
1925				
January	411	251	3,372,207	108,781
February	411	256	3,214,067	114,788
March	410	246	3,571,422	115,207
April	409	221	3,211,235	107,041
May	405	196	2,933,907	94,642
June	399	191	2,679,045	89,301
July	396	188	2,665,262	85,976
August	391	192	2,707,171	87,328
September	387	200	2,725,885	90,862
October	386	209	3,017,889	97,351
November	385	220	3,023,257	100,775
December	385	234	3,249,057	104,808
Total			36,370,404	*99,645

	—Stacks— No.	In	——Output—— Total	Av. Daily
1926				
January	385	225	3,319,789	107,089
February	382	223	2,923,850	104,423
March	377	235	3,458,171	111,554
April	376	237	3,438,805	114,627
May	376	229	3,477,820	112,187
June	372	220	3,232,478	107,749
July	372	217	3,224,663	104,021
August	372	215	3,200,723	103,249
September	372	216	3,163,269	105,442
October	374	218	3,334,206	107,555
November	375	216	3,237,992	107,933
December	369	203	3,089,175	99,651
Total			39,100,941	*107,126

	—Stacks— No.	In	——Output—— Total	Av. Daily
1927				
January	369	210	3,101,346	100,043
February	369	217	2,940,604	105,021
March	365	223	3,482,107	112,326
April	364	221	3,424,377	114,146
May	363	211	3,391,067	109,388
June	362	198	3,089,726	102,991
July	362	190	2,954,625	95,311
August	362	189	2,950,674	95,183
September	362	181	2,782,500	92,750
October	361	174	2,812,015	90,712
November	359	171	2,661,863	88,728
December	354	169	2,698,208	87,039
Total			36,289,112	*99,422

	—Stacks— No.	In	——Output—— Total	Av. Daily
1928				
January	353	184	2,855,515	92,113
February	353	186	2,898,668	99,954
March	350	197	3,199,175	103,199
April	349	195	3,181,975	106,066
May	345	199	3,292,790	106,219
June	343	189	3,082,340	102,745
July	342	185	3,072,711	99,120
August	340	183	3,136,995	101,193
September	340	194	3,063,593	102,120
October	338	196	3,373,539	108,824
November	337	194	3,304,656	110,155
December	335	198	3,369,784	108,702
Total			37,831,741	*103,365

	—Stacks— No.	In	——Output—— Total	Av. Daily
1929				
January	328	202	3,433,028	110,742
February	326	208	3,218,376	114,942
March	326	213	3,709,518	119,662
April	326	216	3,663,167	122,106
May	325	220	3,898,344	125,753
June	325	220	3,715,104	123,837
July	325	217	3,782,511	122,016
August	325	209	3,746,198	120,845
September	323	204	3,496,454	116,548
October	318	203	3,588,146	115,747
November	317	176	3,182,420	106,081
December	316	156	2,836,917	91,513
Total			42,270,183	*115,808

	—Stacks— No.	In	——Output—— Total	Av. Daily
1930				
January	314	173	2,838,751	91,573
February	314	180	2,845,937	101,640
March	314	184	3,252,822	104,930
April	314	182	3,191,119	106,371
May	314	180	3,241,477	104,564
June	312	162	2,934,508	97,817
July	312	144	2,638,441	85,110
August	312	137	2,525,105	81,455
September	310	126	2,276,781	75,893
October	310	111	2,165,374	69,851
November	310	107	1,865,458	62,182
December	310	95	1,665,715	53,732
Total			31,441,488	*86,141

	—Stacks— No.	In	——Output—— Total	Av. Daily
1931				
January	309	102	1,715,443	55,337
February	307	109	1,711,192	61,114
March	307	116	2,028,906	65,448
April	307	113	2,009,582	66,986
May	307	105	1,995,001	64,355
June	303	91	1,637,998	54,599
July	303	82	1,462,270	47,170
August	303	75	1,279,205	41,264
September	303	74	1,168,436	38,947
October	303	69	1,172,781	37,831
November	302	67	1,101,820	36,727
December	301	57	980,377	31,625
Total			18,263,011	*50,035

	—Stacks— No.	In	——Output—— Total	Av. Daily
1932				
January	298	61	971,437	31,336
February	298	64	960,550	33,122
March	298	60	967,015	31,194
April	297	59	855,734	28,524
May	297	54	783,769	25,282
June	297	47	626,015	20,867
July	297	45	570,222	18,394
August	297	41	528,105	17,035
September	295	46	593,640	19,788
October	292	50	644,648	20,795
November	292	51	625,753	20,858
December	291	42	547,179	17,650
Total			8,674,067	*23,699

	—Stacks— No.	In	——Output—— Total	Av. Daily
1933				
January	291	45	568,785	18,348
February	291	44	553,067	19,752
March	291	38	542,013	17,484
April	291	48	623,606	20,786
May	290	61	892,326	28,784
June	289	90	1,264,953	42,165
July	289	105	1,801,345	58,108
August	289	98	1,833,265	59,137
September	289	89	1,507,931	50,264
October	289	81	1,358,540	43,824
November	289	77	1,083,740	36,124
December	...	..	.....	.....
Total			†12,029,571	*36,016

*Average.
†Eleven months.

Composite Market Record

Compiled by STEEL (Iron Trade Review prior to July 1, 1930)

Monthly Averages of Fourteen Iron and Steel Products, 1922-1929

1922	
January	33.35
February	32.86
March	32.97
April	34.42
May	36.49
June	36.96
July	37.50
August	39.79
September	43.79
October	43.60
November	42.08
December	40.53
Average for year	37.86

1923	
January	41.17
February	42.61
March	$45.31
April	47.01
May	47.52
June	46.46
July	45.39
August	44.87
September	44.64
October	43.84
November	42.81
December	43.02
Average for year	44.55

1924	
January	43.26
February	43.49
March	43.24
April	42.33
May	41.38
June	40.61
July	39.78
August	39.33
September	39.05
October	38.65
November	39.00
December	$40.21
Average for year	40.86

1925	
January	41.02
February	41.13
March	40.70
April	39.45
May	38.37
June	37.60
July	37.45
August	37.39
September	37.35
October	37.61
November	38.73
December	39.14
Average for year	38.83

1926	
January	39 17
February	38 95
March	38 88
April	38.48
May	$38.22
June	37.69
July	37.68
August	37.61
September	37.76
October	38 08
November	38.43
December	38.22
Average for year	38.26

1927	
January	37.68
February	36.97
March	36.83
April	36.73
May	36.76
June	36.59
July	36.41
August	36.25
September	36.18
October	35.67
November	35.35
December	35.09
Average for year	36.37

1928	
January	$35.27
February	35.62
March	35.81
April	35.67
May	35.54
June	35.30
July	34.91
August	34.96
September	35.19
October	35.53
November	36.02
December	36.22
Average for year	35.50

1929	
January	$36.24
February	36.28
March	36.42
April	36.81
May	37.10
June	36.99
July	36.71
August	36.54
September	36.50
October	36.23
November	36.03
December	35.95
Average for year	36.48

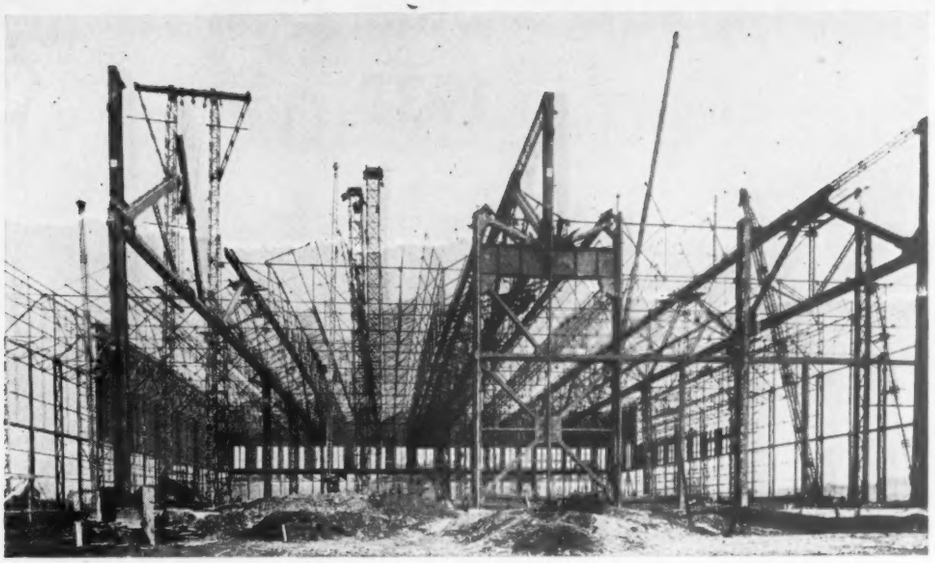
Weekly and Monthly Averages, 1930-1933

1930	
Jan. 1	$35 88
Jan. 8	35 72
Jan. 15	35 60
Jan. 22	35.36
Jan. 29	35.24
Average for January	35.56
Feb. 5	35.24
Feb. 12	35.24
Feb. 19	35.24
Feb. 26	35.24
Average for February	35.24
March 5	35.12
March 12	34.94
March 19	34.89
March 26	34.85
Average for March	34.95
April 2	34.57
April 9	34.52
April 16	34.44
April 23	34.40
April 30	34.28
Average for April	34.44
May 7	33.96
May 14	33.84
May 21	33.56
May 28	33.56
Average for May	33.73
June 4	33.64
June 11	33.52
June 18	33.52
June 25	33.44
Average for June	33.53
July 2	33.34
July 9	33.32
July 16	33.18
July 23	33.14
July 30	33.09
Average for July	33.21
Aug. 6	33.08
Aug. 13	33.00
Aug. 20	33.00
Aug. 27	32.88
Average for August	32.99
Sept. 3	32.78
Sept. 10	32.68
Sept. 17	32.64
Sept. 24	32.56
Average for September	32.65
Oct. 1	32.52
Oct. 8	32.32
Oct. 15	32.24
Oct. 22	32.14
Oct. 29	32.06
Average for October	32.26
Nov. 5	31.98
Nov. 12	31.98
Nov. 19	31.86
Nov. 26	31.86
Average for November	31.92
Dec. 3	31.84
Dec. 10	31.84
Dec. 17	31.68
Dec. 24	31.66
Dec. 31	31.66
Average for December	31.74
Average for year	33.52

1931	
Jan. 7	$31.66
Jan. 14	31.73
Jan. 21	31.73
Jan. 28	31.73
Average for January	31.71
Feb. 4	31.69
Feb. 11	31.69
Feb. 18	31.61
Feb 25	31.61
Average for February	31.65
March 4	31.61
March 11	31.61
March 18	31.71
March 25	31.71
Average for March	31.66
April 1	31.67
April 8	31.67
April 15	31.59
April 22	31.51
April 29	31.49
Average for April	31.59
May 6	31.40
May 13	31.37
May 20	31.37
May 27	31.33
Average for May	31.37
June 3	31.03
June 10	31.03
June 17	31.03
June 24	30.99
Average for June	31.02
July 1	31.11
July 8	31.11
July 15	30.98
July 22	30.98
July 29	31.06
Average for July	31.05
Aug. 5	31.06
Aug. 12	31.06
Aug. 19	31.04
Aug. 26	31.04
Average for August	31.05
Sept. 2	31.04
Sept. 9	31.04
Sept. 16	31.03
Sept. 23	31.02
Sept. 30	31.02
Average for September	31.03
Oct. 3	30.82
Oct. 10	30.78
Oct. 17	30.76
Oct. 24	30.68
Oct. 31	30.64
Average for October	30.74
Nov. 7	30.63
Nov. 14	30.63
Nov. 21	30.63
Nov. 28	30.55
Average for November	30.61
Dec. 5	30.47
Dec. 12	30.36
Dec. 19	30.28
Dec. 26	30.16
Average for December	30.32
Average for year	31.15

1932	
Jan. 2	$29.96
Jan. 9	29.96
Jan. 16	30.08
Jan. 23	30.00
Jan. 30	29.92
Average for January	29.98
Feb. 6	29.60
Feb. 13	29.57
Feb. 20	29.53
Feb. 27	29.53
Average for February	29.56
March 5	29.53
March 12	29.55
March 19	29.57
March 26	29.81
Average for March	29.61
April 2	29.81
April 9	29.74
April 16	29.74
April 23	29.74
April 30	29.70
Average for April	29.75
May 7	29.68
May 14	29.64
May 21	29.58
May 28	29.57
Average for May	29.62
June 4	29.56
June 11	29.56
June 18	29.52
June 25	29.52
Average for June	29.54
July 2	29.52
July 9	29.48
July 16	29.46
July 23	29.46
July 30	29.46
Average for July	29.47
Aug. 6	29.46
Aug. 13	29.34
Aug. 20	29.26
Aug. 27	29.24
Average for August	29.32
Sept. 3	29.32
Sept. 10	29.32
Sept. 17	29.32
Sept. 24	29.32
Average for September	29.32
Oct. 1	29.32
Oct. 8	29.30
Oct. 15	29.33
Oct. 22	29.32
Oct. 29	29.32
Average for October	29.32
Nov. 5	29.32
Nov. 12	29.32
Nov. 19	28.92
Nov. 26	28.91
Average for November	29.12
Dec. 3	28.91
Dec. 10	28.91
Dec. 17	28.91
Dec. 24	28.91
Dec. 31	28.99
Average for December	28.93
Average for year	29.46

1933	
Jan. 7	$28.83
Jan. 14	28.83
Jan. 21	28.55
Jan. 28	28.51
Average for January	28.68
Feb. 4	28.35
Feb. 11	28.27
Feb. 18	28.31
Feb. 25	28.31
Average for February	28.31
March 4	28.35
March 11	28.35
March 18	28.35
March 25	28.35
Average for March	28.35
April 1	28.12
April 8	28.14
April 15	28.14
April 22	28.18
April 29	28.20
Average for April	28.16
May 6	28.29
May 13	28.33
May 20	28.59
May 27	28.59
Average for May	28.45
June 3	28.59
June 10	28.75
June 17	28.75
June 24	28.83
Average for June	28.73
July 1	29.19
July 8	29.67
July 15	30.13
July 22	30.02
July 29	30.02
Average for July	29.81
Aug. 5	30.02
Aug. 12	30.02
Aug. 19	30.02
Aug. 26	30.10
Average for August	30.04
Sept. 2	31.23
Sept. 9	31.23
Sept. 16	31.23
Sept. 23	31.23
Sept. 30	31.60
Average for September	31.30
Oct. 7	31.60
Oct. 14	31.59
Oct. 21	31.59
Oct. 28	31.59
Average for October	31.59
Nov. 4	31.59
Nov. 11	31.59
Nov. 18	31.59
Nov. 25	31.59
Average for November	31.59
Dec. 2	32.42
Dec. 9	32.42
Dec. 16	32.42
Dec. 23	32.42
Dec. 30	32.42
Average for December	32.42
Average for year	29.83



Framework of new fair building at Lille, north of France. The three principal beams supporting the structure are 361 feet long, with depth of 32.80 feet

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European Iron and Steel Domestic Prices in 1933

At Works or Furnace

British Prices in Pounds Sterling Per Gross Ton, at current rate of exchange

	Jan. £ s d	Feb. £ s d	March £ s d	April £ s d	May £ s d	June £ s d	July £ s d	Aug. £ s d	Sept. £ s d	Oct. £ s d	Nov. £ s d	Dec. £ s d
Foundry pig iron, Silicon 2.50-3.00	2-18-6	3- 2-6*	3- 2-6*	3- 2-6*	3- 2-6*	3- 2-6*	3- 2-6*	3- 2-6*	3- 2-6*	3- 2-6*	3- 2-6*	3- 2-6*
Basic pig iron	2-14-0	2-19-0*	2-19-0*	2-19-0*	2-19-0*	2-19-0*	2-19-0*	2-19-0*	2-19-0*	2-19-0*	3- 2-6*	3- 5-0*
Furnace coke	0-13-6	0-13-6	0-13-6	0-13-3	0-13-3	0-13-3	0-13-3	0-13-3	0-13-6	0-14-6	0-15-0	0-15-0
Billets	5- 0-0	5- 0-0	5- 0-0	5- 0-0	5- 0-0	5- 0-0	5- 0-0	5- 0-0	5- 2-6	5- 5-0	5- 7-6	5-10-0
Standard rails	8- 5-0	8- 5-0	8- 5-0	8- 5-0	8- 5-0	8- 5-0	8- 5-0	8- 5-0	8- 5-0	8- 5-0	8- 5-0	8- 5-0
Merchant bars	6-15-0	6-15-0	6-15-0	6-15-0	6-15-0	6-15-0	6-17-6	6-17-6	6-17-6	6-18-0	7- 5-0	7-10-0
Shapes	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0
Plates, ship, bridge and tank	8-17-6	8-15-0	8-15-0	8-15-0	8-12-6	8-10-0	8-10-0	8-10-0	8-10-0	8-10-0	8-10-0	8-10-0
Sheets, black, 24-gage	9-10-0	9-10-0	9-10-0	9-10-0	9-12-6	9-15-0	10- 0-0	10 -0-0	10- 0-0	10- 5-0	10- 5-0	10- 5-0
Sheets, galvanized, 24-gage, corrugated	11-15-0	11-15-0	11-15-0	11-15-0	11-17-6	12- 0-0	12-10-0	12-10-0	12-10-0	12-15-0	12-15-0	12-15-0
Plain wire	9- 5-0	9- 5-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0	9- 0-0	9- 5-0
Hoops and bands	9-10-0	9-10-0	9-10-0	9-10-0	9-10-0	9-10-0	9-10-0	9-10-0	9-10-0	9-10-0	10-10-0	10- 0-0

*Delivered Middlesbrough.

German Prices in Reichsmarks Per Metric Ton

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Foundry pig iron, Silicon 2.50-3.00	63	63	63	63	63	63	63	63	63	63	63	63
Hematite pig iron	69.50	69.50	69.50	69.50	69.50	69.50	69.50	69.50	69.50	69.50	69.50	69.50
Furnace coke	19.20	19.20	19.25	19.25	19.25	19.25	19.25	19.25	19.25	19.25	19.25	19.25
Billets	96.50	96.50	96.50	96.50	96.50	96.50	96.50	96.50	96.50	96.50	96.50	96.50
Standard rails	132	132	132	132	132	132	132	132	132	132	132	132
Merchant bars	110	110	110	110	110	110	110	110	110	110	110	110
Shapes	107.50	107.50	107.50	107.50	107.50	107.50	107.50	107.50	107.50	107.50	107.50	107.50
Plates, 5 millimeters	127	127	127	127	127	127	127	127	127	127	127	127
Sheets, black, 1 to 3 millimeters, basis	144	144	144	144	144	144	144	144	144	144	144	144
Sheets, galvanized, 24-gage, corrugated	370	370	370	370	370	370	370	370	370	370	370	370
Plain wire	177	177	177	177	177	177	177	177	177	177	177	177
Hoops and bands	127	127	127	127	127	127	127	127	127	127	127	127

French Prices in French Francs Per Metric Ton

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Foundry pig iron, Silicon 2.50-3.00	210	205	195	180	195	200	210	215	215	215	215	215
Basic bessemer pig iron	170	170	170	170	175	190	195	190	190	185	185	185
Furnace coke	120	120	120	120	120	120	120	120	120	120	120	120
Billets	370	370	370	385	405	405	405	405	405	405	405	405
Standard rails	700	700	700	700	700	700	700	700	700	700	700	700
Merchant bars	530	530	530	530	560	560	560	560	560	560	560	560
Shapes	550	550	550	550	550	550	550	550	550	550	550	550
Plates, 5-millimeter	650	650	680	680	680	680	680	680	680	680	680	680
Sheets, black, 2 millimeters	800	800	850	850	850	850	850	850	850	850	850	850
Sheets, galvanized, 0.6-millimeter, cor.	1350	1325	1350	1400	1400	1450	1450	1450	1450	1450	1450	1450
Plain wire	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130	1130
Hoops and bands	580	580	580	580	580	600	620	620	650	650	650	650

Belgian Prices in Belgian Francs Per Metric Ton

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Foundry pig iron, Silicon 2.50-3.00	290	290	290	290	300	300	300	305	305	305	305	305
Basic bessemer pig iron	225	225	225	225	230	230	280	290	290	290	290	290
Furnace coke	110	110	110	110	110	110	110	110	110	110	110	110
Billets	365	370	375	390	395	430	440	440	440	440	440	440
Standard rails	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100
Merchant bars	480	485	485	485	510	530	535	535	535	535	535	535
Shapes	475	480	475	480	510	530	535	535	535	535	535	535
Plates, 5 millimeters	575	585	600	620	655	675	675	675	675	675	675	675
Sheets, black, 1 to 3 millimeters, basis	700	700	700	700	700	725	750	750	750	750	750	750
Galvanized sheets, corrugated, 0.5-milli.	1400	1440	1420	1425	1450	1450	1450	1475	1500	1500	1500	1500
Plain wire	1350	1300	1300	1300	1300	1300	1300	1300	1300	1300	1100	1100
Hoops and bands	635	650	675	675	675	675	675	675	675	675	675	675

1933 Marks Upward Turn From Europe's Depth of Depression

BY VINCENT DELPORT
European Manager, STEEL

IN ALMOST every European country, steel production and home consumption have increased in 1933, in comparison with 1932; in most cases, domestic and export prices have strengthened. On the other hand, foreign trade, as measured by imports and exports of iron and steel, has further contracted, but in a smaller proportion than was the case during the year 1932.

It can, therefore, be said that the past year has seen the beginning of recovery in European industry, although in a small number of countries the year ended in less satisfactory conditions than might have been expected during the summer months.

Of all countries, Great Britain made the most decisive recovery, which extended to almost every field of trade and industry. In many respects, the revival of British business can serve as an encouragement and a lesson to the rest of the world. A lesson, because the seeds of the recovery were sown in the latter part of 1931, thanks to heavy sacrifices that were accepted by the British people.

At that time the outlook was very dark, and the finances of the country in a critical condition. A substantial increase in taxation, accompanied by severe retrenchment that spread over all sections of the community, enabled the budget to be balanced and British credit to be restored.

Tariff and Monetary Measures Lend Aid To British Steel Industry

The shock caused at that time by the pound sterling being driven off gold was of short duration, and soon confidence in the capacity of the British people to surmount the crisis reappeared, not only at home, but also abroad. This confidence was maintained during the period of acute depression in 1932, but already at the end of that year the cloud began to lift and signs of a new dawn became apparent.

The year 1933 thus started hopefully, and the assistance given to the business community by the tariff policy instituted in 1932 was particularly beneficial to the iron and steel industry, with the result that imports were cut by 40 per cent, while exports maintained the level of 1932, with a tendency to expand at the end of last year.

The depreciation of the pound also was helpful, but its effects were partly counteracted by the special taxes set up in certain markets against imports originating from countries with a depreciated currency, and other restrictive measures.

The British revival is also an encouragement to other nations, because although it was brought about by drastic measures, these were measures which had proved their soundness in previous emergencies and which were in no way revolutionary. This tends to show that trade can only flow in an atmosphere of confidence, maintained by a severe balancing of the nation's budget, a definite policy, a judicious control of the national currency and of credit, and an acceptance of the fundamental laws of economics.

Steel Entente and Comptoirs Give Continent Better Control of Its Business

As a result of these factors, while unhealthy booms were avoided, a gradual expansion of business established itself in Great Britain, followed by a slow rise in prices, and followed only later by a slight rise in production costs, which was partly limited by increased and more economical production.

During 1933 the principal steel-producing countries of the Continent consolidated their positions by various processes of reorganization and reduction of overhead charges. France concentrated on her domestic market and increased her production. In Germany and Italy, more work also was found for home markets, thanks to the impetus given by strong leadership.

Countries that depend mostly on their export trade, such as Belgium, Luxemburg, and, to a lesser extent, Czecho-Slovakia and Poland, found conditions more difficult, but succeeded in improving their situation in comparison with that of the previous year. Generally speaking, Continental domestic prices were firm, and showed a rising tendency during second half of 1933.

An outstanding feature of the past year was the re-establishment of the Steel Entente and

the organization of the international selling syndicates. Although this has resulted in closer co-operation between Continental steel producers, and in the lifting and maintaining of export prices at a higher level, it cannot be said that an expansion of export trade has followed as a direct consequence; but on the whole it is recognized that these associations are beneficial to the trade generally. Many difficulties had to be solved, even after the formation of the syndicates, and several obstacles still have to be overcome, but a successful outcome is generally anticipated.

Great Britain is not a party to the Continental Steel Entente. This is not due to any systematic disinclination to join, but the leaders of the British steel industry do not feel that the time will be ripe for such a step until the industry is organized nationally. Actually, the elaboration of a scheme of reorganization was discreetly pursued throughout the year, and a complete scheme, established on the general lines indicated in STEEL for April 17, 1933, will be presented to the industry in the near future.

When sufficient time has been given for the scheme to become firmly established, British steelmakers will be in a position to negotiate with the steel entente with a view to co-operating on a fair basis, taking into account the then existing possibilities of the British industry.

As 1934 opens there still are several zones of danger in the world, but if grave disturbances can be avoided, and artificial trade barriers at least partly removed, a gradual and definite revival of trade and industrial production can be looked for.

Prosperity will more assuredly be given to the world by gradual recovery, brought about by proved methods and the play of natural forces, than by attempts to create a sudden revival by artificial measures, which, in the long run, destroy their own ends.

European Iron and Steel Export Prices in 1933

F. o. b. Ports of Shipment

British Prices in Pounds Sterling Per Gross Ton

at current rate of exchange

	Jan. £ s d	Feb. £ s d	March £ s d	April £ s d	May £ s d	June £ s d	July £ s d	Aug. £ s d	Sept. £ s d	Oct. £ s d	Nov. £ s d	Dec. £ s d
PIG IRON												
Foundry, No. 3, Middlesbrough	2-18-6	2-18-6	2-18-6	2-18-6	2-18-6	2-18-6	2-18-6	2-18-6	2-18-6	2-18-6	2-18-6	2-18-6
Basic, Middlesbrough	2-14-0	2-14-0	2-14-0	2-14-0	2-14-0	2-14-0	2-14-0	2-14-0	2-14-0	2-14-0	2-14-0	2-14-0
Hematite, East Coast	2-19-0	2-19-0	2-19-0	2-19-0	2-19-0	2-19-0	2-19-0	2-19-0	2-19-0	3- 0-0	3- 0-0	3- 0-0
SEMIFINISHED STEEL												
Billets	4-17-6	5- 0-0	5- 0-0	5- 0-0	5- 0-0	5- 0-0	5- 0-0	5- 0-0	5- 2-6	5- 5-0	5- 7-6	5-10-0
Wire rods	7-10-0	7-10-0	7-10-0	7-10-0	7-10-0	7-10-0	7-10-0	7-10-0	7-10-0	7-10-0	7-10-0	7-16-0
FINISHED STEEL												
Standard rails	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0
Merchant bars	6- 5-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-12-6	6-13-6	6-15-0	6-15-0	6-15-0	6-15-0
Structural shapes	7-7- 6	7- 7-6	7- 7-6	7- 7-6	7- 7-6	7- 7-6	7- 7-6	7- 7-6	7- 7-6	7- 7-6	7- 7-6	7- 7-6
Plates, ship, bridge and tank	8-10-0	8-10-0	8-10-0	8-10-0	8- 5-0	8- 5-0	8- 5-0	8- 5-0	8- 5-0	8- 5-0	8- 0-0	8- 0-0
Sheets, black, 24-gage	8-10-0	8-10-0	8-10-0	8-10-0	8-10-0	8-12-6	9- 0-0	9- 0-0	9- 0-0	9- 5-0	9- 5-0	9- 5-0
Sheets, galvanized, 24-gage, corrugated	10-10-0	10-10-0	10-10-0	10-10-0	10-10-0	10-12-6	11- 0-0	11- 0-0	11- 0-0	11- 5-0	11- 5-0	11- 5-0
Hoops and bands	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0
Plain wire, base	9- 5-0	9- 5-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0	9- 0-0	9- 5-0
Galvanized wire, base	11- 0-0	11- 0-0	10-10-0	10-10-0	10-10-0	10-10-0	10-10-0	10-10-0	10-10-0	10-10-0	10-15-0	11- 0-0
Wire nails, base	11- 0-0	12- 0-0	12- 0-0	12- 0-0	12- 0-0	12- 0-0	12- 0-0	12- 0-0	12- 0-0	12- 0-0	12- 0-0	12- 0-0
Tinplate, base box 108 pounds	0-16-0	0-16-0	0-15-9	0-15-9	0-16-0	0-17-0	0-17-3	0-17-0	0-16-9	0-16-9	0-17-0	0-17-0
Ferromanganese†	$68	$68	$68	$68	$68	$68	$68	$82	$82	$82	$82	$82

†Delivered Atlantic Seaboard duty-paid.

Continental Prices in Gold Pounds Per Metric Ton

F. o. b. Channel or Northern Sea Ports

	Jan. £ s d	Feb. £ s d	March £ s d	April £ s d	May £ s d	June £ s d	July £ s d	Aug. £ s d	Sept. £ s d	Oct. £ s d	Nov. £ s d	Dec.d £ s
PIG IRON												
Foundry, Silicon 2.50-3.00	1-14-0	1-14-0	1-14-0	1-14-0	1-14-0	1-14-0	1-14-0	1-14-0	1-14-0	1-15-0	1-16-6	1-16-6
Basic bessemer	1- 7-0	1- 7-0	1- 7-0	1- 8-0	1-10-0	1-10-0	1-10-0	1-10-0	1-10-0	1-10-0	1-10-0	1-10-0
SEMIFINISHED STEEL												
Billets	2- 0-0	2- 1-0	2- 2-0	2- 3-0	2- 5-0	2- 7-0	2- 7-0	2- 7-0	2- 7-0	2- 7-0	2- 7-0	2- 7-0
Wire rods	4-10-0	4-10-0	4-10-0	4-10-0	4-10-0	4-10-0	4-10-0	4-10-0	4-10-0	4-10-0	4-10-0	4-10-0
FINISHED STEEL												
Standard rails	5-10-0	5-10-0	5-10-0	5-10-0	5-10-0	5-10-0	5-10-0	5-10-0	5-10-0	5-10-0	5-10-0	5-10-0
Merchant bars	2- 7-6	2- 8-6	2- 8-6	2-10-0	2-16-0	3- 0-0	3- 0-0	3- 0-0	3- 0-0	3- 0-0	3- 2-6	3- 2-6
Structural shapes	2- 1-0	2- 1-6	2- 2-6	2- 5-0	2-10-0	2-15-0	2-15-0	2-15-0	2-15-0	2-15-0	2-17-6	2-17-6
Plates, 5 millimeters	2-19-0	3- 2-6	3- 5-0	3- 9-0	3-15-0	3-18-6	3-18-6	3-18-6	3-18-6	3-18-6	4- 1-0	4- 1-0
Sheets, black, 24-gage	5-13-6	5-15-6	5-16-6	5-17-6	5-18-0	5-18-0	6- 2-6	6- 1-3	6- 0-0	6- 0-0	6- 0-0	6- 0-0
Sheets, galvanized, 24-gage, corrugated	6-15-0	6-15-0	6-12-6	6-12-6	6-13-9	6-15-0	7- 5-0	7- 5-0	7- 5-0	7- 5-0	7- 5-0	7- 5-0
Hoops and bands	3- 9-6	3- 9-6	3-10-0	3-11-0	3-12-6	3-12-6	3-12-6	3-15-0	3-15-0	3-15-0	3-15-0	3-15-0
Plain wire, base	5- 7-6	5- 7-6	5- 7-6	5- 7-6	5- 7-6	5- 7-6	5- 7-6	5- 7-6	5- 7-6	5- 7-6	5- 7-6	5- 7-6
Galvanized wire, base	6- 6-0	6- 6-0	6- 6-0	6- 6-0	6- 6-0	6- 6-0	6- 6-0	6- 6-0	6- 6-0	6- 6-0	6- 6-0	6- 6-0
Wire nails, base	5-15-0	5-15-0	5-15-0	5-15-0	5-15-0	5-15-0	5-15-0	5-15-0	5-15-0	5-15-0	5-15-0	5-15-0

British Steel Trade Now On The Upgrade

BY J. A. HORTON
British Correspondent, STEEL

IN THE first three months of 1933, the British iron and steel trade gained no strength, but from April onward there was slow but steady revival, becoming more pronounced in the third and fourth quarters.

In 1929, the record year since 1917, steel output was over 9,500,000 tons. Taken as a percentage of 1929, output in 1930 was 76 per cent; in 1931 it dropped to 54 per cent; in 1932 it remained at 54 per cent, but by the end of 1933 it had risen to 66 per cent.

Further evidence of the reality of the revival was forthcoming in September, when steel production, at 669,000 tons, was the best in any month since 1930. At the end of the first ten months, the monthly average had reached 564,000 tons, compared with a monthly average in 1932 of 438,000 tons.

Pig iron followed closely the upward trend of steel, and at the end of October 74 blast furnaces were in operation, against 60 at the beginning of the year, while production increased from 286,600 tons in January to 373,300 tons in October.

Protection Limited Imports

The benefits derived from the adoption of protection are plainly visible in the returns of overseas business. Iron and steel imports in the third quarter totaled 223,486 tons, against 224,857 tons in the second quarter and 244,394 tons in the first quarter. In the ten months ended October, 789,143 tons were imported, compared with 1,461,603 tons in the same period of 1932 and 2,205,694 tons in the corresponding period of 1931.

Export trade has not increased in inverse ratio to the drop in imports, but the shrinkage which had been a gradual process since 1929 has definitely been checked. While exports fell from 1929 to 1931, they have remained steady since at about 1,900,000 tons each year.

In other words, although import duties checked imports as from 1932, this check had no reaction on exports, which had ceased to fall 12 months before import duties were imposed. There seems every prospect, therefore, of an expansion in British export trade in the coming year, especially as plans for reorganization of the industry are being put into effect.

One of the most important moves is the scheme to augment the potential output of billets and sheet bars by at least 300,000 tons annually, a step necessitated by trade development in 1933. It is being undertaken by the British (Guest Keen Baldwins) Iron & Steel Co. Ltd., which was registered in 1930 to amalgamate the heavy iron and steel interests of Guest, Keen & Nettlefolds Ltd., and Baldwins Ltd.

Plans have been prepared to reconstruct the Cardiff-Dowlais steelworks, with a view to the direct employment of 1500 steelworkers at the end of a two-year scheme of reconstruction, and also indirectly to employ miners, railwaymen, dock workers and limestone quarries. As indicating the extent to which the steel will replace that previously bought from the Continent, it may be noted that in 1931 342,000 tons of billets and bars were landed at two ports, Cardiff and Newport, and in 1932 the total was 302,000 tons.

With the progress of the year the situation changed materially. When the import duty of 33 1/3 per cent was imposed there were large stocks of foreign billets and bars in Britain. These stocks were renewed or partly renewed from time to time, foreign supplies being offered at uneconomic prices in an endeavor to retain a hold on the British market. That, however, could not continue long.

British prices compare favorably today with those of France, Belgium and Germany, now acting together through the reconstructed cartel. Improving trade in the domestic market brought a realization of the danger concerning the replacement from home sources of supplies which formerly came from outside. Consequently, the South Wales enterprise, which will cost £2,000,000, comes at an opportune moment. In the fall of 1933 no billets were available for early delivery, and rerollers had bought heavily into the first quarter of 1934.

Structural steel fared badly throughout the year. Building programs failed to provide any outlet for plate and section mills. Railways, too, found little work throughout the year. Shipyards have played a minor part in such recovery as has been made in the heavy steel trade, but Lloyds' returns are now more heartening than they have been for years.

Steadily Prices Give Strength

One of the healthiest signs of the solidity of the British iron and steel industry is the steadiness of prices in all departments through the last three or four years. The Steel Manufacturers' association set a standard in December, 1929, which, except for minor adjustments, has been stationary ever since. Sheet makers, having more recently reformed their association, have advanced prices by 25s to export customers during a period of 12 months.

In the same time, Continental competitors have been able to lower their prices for finished material and are still in a position to cut British prices for beams and similar products. British manufacturers have not maintained the rigid control of prices without a sacrifice, as the per-

British Business Progress in 1933

(Gross tons 000 omitted)

	PRODUCTION				IMPORTS			EXPORTS		
Monthly ave.	Coal	Pig iron and ferro-alloys	No. fur-* naces in blast	Steel ingots and castings	Iron ore	Pig iron and ferro-alloys	Steel†	Furnace Coke	Pig iron and ferro-alloys	Steel†
1913	23,951	855	338	639	603	18.0	168	...	93.7	320
1930	20,313	516	76	610	345	26.0	216	129	26.4	237
1931	18,346	314	70	433	177	25.5	212	118	16.8	148
1932	17,437	298	60	438	150	13.1	120	114	10.7	147
1933										
Jan.	18,797	287	62	444	164	9.9	59	142	6.9	149
Feb.	17,829	271	63	483	211	5.8	72	115	5.8	130
March	19,513	332	70	578	218	7.0	90	88	9.5	145
April	15,419	325	69	510	245	10.5	60	48	7.3	126
May	17,386	340	72	600	242	12.2	73	72	12.6	166
June	15,284	346	72	569	214	8.1	61	118	7.3	146
July	15,083	344	69	567	229	9.6	54	116	11.1	145
Aug.	15,429	363	73	551	227	17.3	62	162	9.3	145
Sept.	16,589	360	74	669	227	6.9	73	169	8.4	149
Oct.	18,114	373	74	668	251	9.9	79	156	8.2	185
Mo. ave.	16,944	334	74	564	223	9.7	68	119	8.6	149

*Average for 1913; on last day of year or month for subsequent figures. †Includes iron castings, but scrap excluded.

usal of any published balance sheet of one of the large steelmaking companies will prove. The dividing line between profit and loss has, indeed, been narrow, and shareholders have reaped little dividend since the war.

Pig iron has made a generous contribution to the recovery of trade. For this the light foundries have been mainly responsible, due in large measure to the sustained activity in the building trade, where light castings and kindred products have been absorbed in larger quantities.

When the year opened, output from the furnaces, only 60 of which were in operation, exceeded the needs of the market. Not only has demand caught up with production, but there also is now a definite lessening of excessive burden of stocks.

As in the steel trade, price control has been exercised rigidly. In the South Staffordshire zone, for example, pig iron of forge and foundry qualities has remained at the same price since May, 1931. Suspension of control was found necessary in South Wales and the west of England to meet foreign competition in the different phases through which the trade has passed since the introduction of import duties.

There has been likewise a revision of the scale as it applies to various other districts, and the zone system with graded prices has been extended in the southern provinces.

The increase of the duty on pig iron from 10 to 33 1/3 per cent effectively put an end to attempts by French and Belgian producers to recoup themselves for the loss of trade in semis and finished steel. Scarcely any foreign pig iron has been imported, apart from that from Sweden, for which special facilities are granted by trade agreement, and a certain amount from India.

One of the most encouraging features of the outlook is that a £2,300,000 development scheme is to be carried out by the London & North Eastern railway. This program will include the construction of locomotives, passenger cars, freight cars, and the renewal of bridges and the permanent way.

National Plan in Making

The basis of a national scheme for the restabilization of industry has yet to be declared, but it is noteworthy that considerable progress has been made toward meeting the better days ahead. Work has commenced on the huge enterprise initiated by Stewarts & Lloyds Ltd. for turning the Northamptonshire iron ores into steel by the basic bessemer process, an important step toward replacing imported supplies.

Northamptonshire is one of the great ore beds of the world, and the company controls reserves to the extent of some 500,000,000 tons. As part of the scheme, plant for tube manufacture will be installed on the same site as the steelworks, in order to secure a continuous program of manufacture from the ore to the finished tube, British material being used throughout. The scheme involves expenditure of £3,300,000.

In 1931, British exports of galvanized sheets totaled 288,795 tons; in 1932 they reached only 278,380 tons, while in the first ten months of 1933 the total was 228,365 tons. For some time, Belgian makers have continued to undercut British products in the foreign markets.

The Welsh tin plate trade has been heavily handicapped by foreign exchange restrictions and frozen credits, but while export business shows a loss, there has been a marked increase in the domestic consumption of tin plate, the consumption in 1932 being 269,000 tons, compared with 196,000 tons in 1923. This increase is largely due to the rapid growth of the canning industry in Britain.

As to the future of Britain's iron and steel industry, there is now every reason to believe that, given more stabilized conditions in Europe, the revival which has begun in certain branches will spread. The year 1933 will be looked upon as having marked the upturn from the low point of the depression.

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Germany Strives To Overcome Trade Crisis

BY DR. E. H. REGENSBURGER
German Correspondent, STEEL

FOR the first time since 1929, an increase in the production of German iron and steel was registered in 1933. In the previous year of depression, the pig iron output had fallen to about 29 per cent, and the raw steel production to 35 per cent of 1929 figures.

When, in September, 1932, the Bruning government decided to discontinue the policy of deflation, the basis was laid for the improvement which set in in 1933 and which was strengthened by the policies of the National-Socialist government which came into power at the end of January, 1933. The new government concentrated its power on the fight against unemployment.

Vast Plans Put Under Way

Giant programs, aggregating about 3,870,000,000 marks, were drawn up for this purpose, of which, up to the end of the year, about 800,000,000 marks were spent. According to official figures, the government thus succeeded in increasing the number of wage-earners during the 12 months ended September, 1933, by about 8 per cent, and the value of the industrial output of the country by about 22 per cent.

This improvement of the situation was reflected by the activities of the iron and steel industry. During the first ten months of 1933, production of both pig iron and raw steel increased by 28 per cent in comparison with 1932 averages, and that of rolled products by 24 per cent. Sales of the leading combines also showed an increase, those of the United Steel Works Co. having increased from 520,900,000 to 565,700,000 marks, or about 9 per cent, compared with 1,445,000,000 marks in 1929.

It is, however, interesting to note that only its domestic sales advanced during the financial year, from 316,700,000 to 370,100,000 marks, whereas export sales continued to decline, from 204,200,000 to 195,600,000 marks. This development is typical not only for this, the largest German industrial combine, but also for the German industry as a whole. The financial results of the heavy industrial combines improved, but where some were in a position to register a small profit again, this was mainly due to a book-profit resulting from the depreciation of indebtedness.

In this connection it must be mentioned that the German industry as a whole was in a favorable position to reduce its foreign indebtedness, substantially owing to the depreciation of these currencies, in this way rebuilding its financial basis for the future.

Such profits, however, were insufficient to enable the United Steel Works Co. to avoid a fundamental reorganization, which took place at the end of the year and which provided for a merger of that company with its founder-companies, Phoenix, Van der Zypen, and the Gelsenkirchener Mining Co., the latter, as a result of this complicated transaction, taking in its turn the name of United Steel Works Co. This new combine, which, as heretofore, controls about half of the German steel output, has a capital stock of 560,000,000 marks and will own 13 individual producing companies, of which it will hold the shares.

The crux of the whole situation continues to be the unsatisfactory development of export trade, notwithstanding the various methods of assisting German competition abroad by making use of the depreciation of blocked marks. Foreign tariff walls and exchange restrictions, growing Japanese competition, and the depreciation of the pound constituted a most serious handicap. The depreciation of the dollar did not have the same unfavorable results on German steel exports, except as regards South America, especially Brazil and the Argentine Republic.

Foreign Trade at Low Ebb

Germany's exports of iron and steel, including scrap, during the first nine months of 1933 registered a further slight decline, being 1,549,619 metric tons, compared with 1,867,927 tons in the corresponding period of 1932 and 3,749,408 tons in 1930. However, in August and September, for the first time in 1933, export sales were again ahead of the 1932 exports, which was the more astonishing because the big Russian purchases which had swollen foreign shipments in 1932 were not repeated.

German iron and steel exports in 1933 aggregated about 20 to 25 per cent of the output, against 34 per cent in 1932 and 40 per cent in 1931. The establishment of the international steel export association has not yet resulted in changing the losses from export sales into profits, but doubtless an improvement of the situation will result therefrom.

In view of this situation, producers concentrated on the domestic market. During the fall, the industry was working at about 50 per cent of capacity, compared with only 28 per cent, the low point of September, 1932. The measures taken against unemployment began to show their results during the latter part of the year in an increasing activity of the steel industry.

Also, a contract, placed by the railroads, for 40,000 tons of steel products a month was a welcome feature for the mills. Notwithstanding the improved demand, domestic prices,

German Business Progress in 1933

(Metric tons — 000 — omitted)

Mo. ave.	PRODUCTION* Coke	Pig iron and ferro-alloys	No. fur-† naces in blast	Steel ingots and ca tings	IMPORTS‡ Pig iron and ferro-alloys	Steel§	EXPORTS‡ Coke	Pig iron and ferro-alloys	Steel§
1913.....	2,639	910	204	993	11.0	41	534	71	470
1930.....	2,705	808	63	962	14.3	94	664	19	381
1931.....	1,932	505	47	691	9.9	68	528	16	345
1932.....	1,594	327	42	479	5.3	61	432	6	201
1933									
Jan.....	1,763	403	46	540	7.7	76	488	5.3	143
Feb.....	1,613	340	45	464	5.1	104	437	6.1	126
March....	1,691	426	46	588	5.8	134	389	8.4	145
April.....	1,543	374	43	531	4.4	113	333	6.2	160
May.....	1,687	414	40	643	3.9	102	382	11.3	179
June.....	1,704	424	44	666	6.9	98	400	9.8	179
July.....	1,781	440	43	641	5.7	91	428	14.1	178
Aug.....	1,794	473	45	706	7.2	93	506	9.4	187
Sept.....	1,706	437	46	632	8.1	95	560	11.6	170
Oct.....	1,785	492	50	715	5.2	112	533	12.2	184
Mo. ave..	1,707	422	50	613	6.0	102	446	9.4	165

*Figures for 1913 are for Germany in her present boundaries. †On last day of year or month. ‡Figures for 1913 are for pre-war boundaries and include Luxemburg. §Includes iron castings and scrap.

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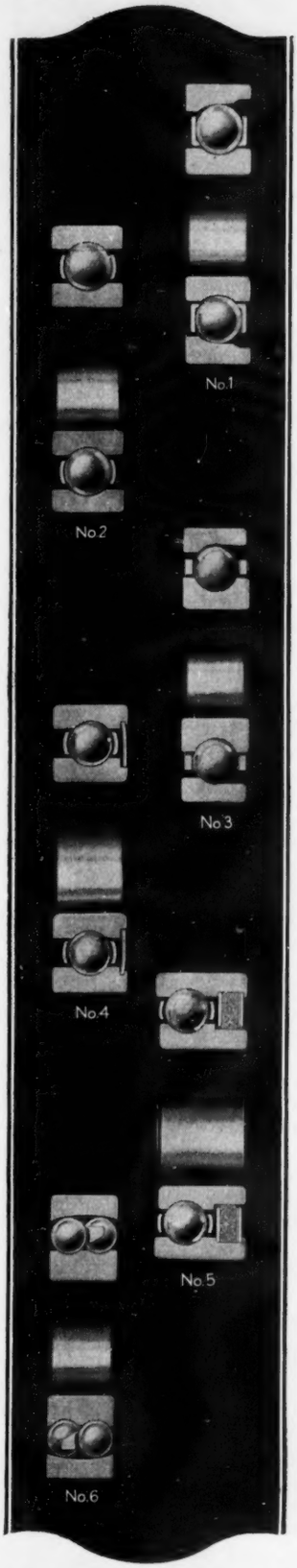

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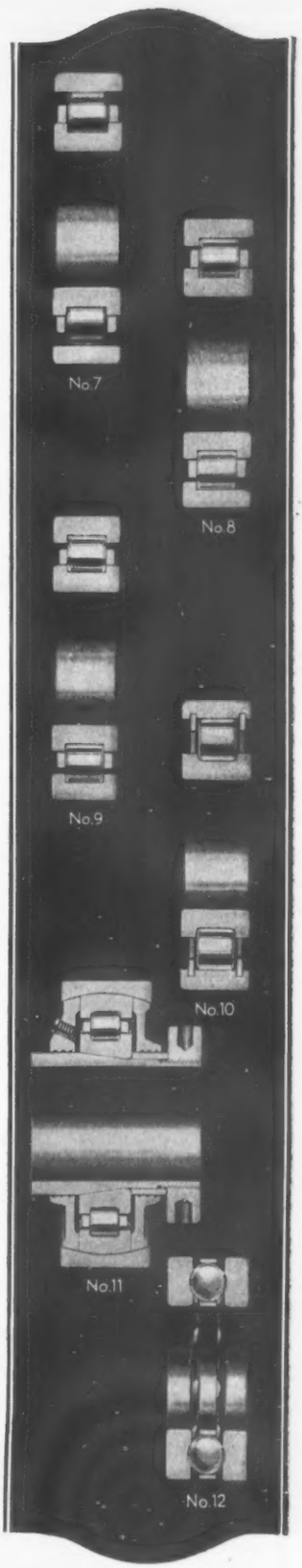

BEARINGS

which continued to remain substantially above the world market level, did not increase throughout the year.

Imports of foreign steel were considerably ahead of those of last year, totalling 960,574 metric tons for the first nine months, against 549,447 tons in the corresponding period of 1932, but when imports of scrap are excluded, the increase was only from 505,940 tons to 698,380 tons. This advance was mainly due to larger deliveries of merchant bars from the Saar district, beams, hoops and bands, rails, and wire.

An interesting feature was the increase of scrap imports during the first nine months from 43,507 metric tons to 262,190 tons. At the same time, exports of scrap shrank from 196,186 metric tons to 111,688 tons. thus leaving an import surplus of 150,502 tons of scrap, compared with an export surplus of 152,661 tons a year before.

This was the case notwithstanding the additional output resulting from the dismantling of old German ships. Scrap prices, which in September, 1933, were up to 40 per cent above those of a year before, suffered a small reduction by the end of October.

Imports of iron ores advanced to 3,413,695 metric tons during the first nine months of 1933, compared with 2,564,864 tons in the corresponding period of 1932 and 6,101,156 tons in 1931. German producers again succeeded in arranging with Swedish mine-owners for another postponement of shipments of ores to German furnaces, due to the fact that stocks of ores in this country were still estimated at something like 9,000,000 metric tons.

The situation in the pig iron market slightly improved, owing to greater activity of steel mills. At the end of October, 50 out of 157 furnaces were in blast, compared with 32 a year before, but already in January, 46 blast-furnaces were being operated. Prices of pig iron remained unchanged, and the rebate of 6 marks per metric ton, which was first granted in November, 1932, remained effective throughout the year. Imports of pig iron during the first nine months of the year amounted to 54,330 metric tons, against 41,787 tons in the same period of 1932, while exports increased from 43,723 tons to 77,043 tons. The life of the pig iron association was prolonged by three years to Jan. 31, 1935.

Many Economic Changes Made

The changes which occurred in the economic and political life of Germany were also reflected in the organization of the various German steel associations. In April the government appointed a state commissioner to regualte relations between the iron-producing and the iron-consuming industries. In this way, producers pledged themselves to supply rolled products to the uncontrolled working-up firms at the same prices as those at which they are delivered to the manufacturing combines controlled by themselves. The government also establishd a compulsory syndicate for all wire mills.

Finally, by the end of the year a new organization for merchants and jobbers was arranged; many of the numerous existing associations were dissolved, and a central organization was established as the association of German iron merchants. Its purpose is to regulate prices and selling conditions, but it is stated that at present no changes of the existing prices are aimed at.

The outlook for 1934 is more obscure than ever, owing to the great unsettled problems of international politics, economics and currency. The year 1933 gave a fair start toward overcoming the severe crisis, but this improvement was based entirely upon the revival of domestic business, being financed mainly by mortgaging the public income of future years. The year 1934 will have to justify this policy, which will largely depend upon whether world business as a whole improves again and whether Germany is in a position to regain its lost world markets.

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French Steel Industry Meets Difficult Year Bravely

BY J. M. LEON
French Correspondent, STEEL

MANUFACTURING and trade conditions in France showed little improvement during 1933. Attempts made to remedy the crisis do not appear to have been successful, but as the year came to an end there were signs that the world is endeavoring to adapt itself to a new order of things, and that, following the period of upheaval which has succeeded the World war, there is trend toward a new equilibrium.

In France, and more especially in the iron and steel industry, business leaders have been aware that the industrial output of the world exceeds the consuming power, not because man's wants are satisfied, but because it is easier to increase production than to organize distribution. Until this problem of distribution is solved, it is necessary to control production and prevent markets from becoming inundated.

The desire of producers to sell at any price in quarters where credit is still good has induced nations to defend their domestic markets in order to avoid closing down a large number of works; that is the motive which inspired the French government in its actions toward maintaining a system of quotas and applying it as strictly as possible.

French Markets Are Isolated

The French have endeavored to isolate themselves, with the result that domestic prices bear no relation to export or foreign prices. The difference between export and domestic iron and steel prices considerably exceeds the French tariff duties. On the other hand, the policy of defending agriculture, which has always been a characteristic of French statesmanship, has had the result of maintaining prices of commodities at a high level, and, consequently, these joint influences have maintained a high cost of living.

In 1933, France suffered from a certain amount of unemployment. Jan. 1 212,657 male workers and 64,452 women were out of work. June 1 the figures were 210,915 and 65,682 respectively, and Nov. 1 they had dropped to 181,622 and 51,258. These figures do not take account of the large number of men and women who were only working part time; throughout the year a large number of works were operating only three or four days per week. Modifications in wage rates during the year were few and of little importance.

The deliveries of products controlled by the comptoirs between Jan. 1 and Oct. 1 were as follow:

	Domestic market	Export markets
	Metric tons	
Semifinished steel ...	424,190	245,436
Merchant bars	723,889	274,926
Beams	212,348	155,136
Wire rod	208,012	61,061

The French iron and steel industry is now almost completely organized. The Comptoir Siderurgique de France groups the various controlling bodies, and has strengthened its organization. A number of syndicates or comptoirs were formed during the year, and although they are not all of the same importance as the already-existing large comptoirs, they are indispensable to the good working of the industry generally, as it is often in respect of specialized products that competition is the most destructive.

There is, in fact, a tendency to syndicate practically all products, but there are many considerable difficulties in the way. Negotiations are on foot to organize a special-steel syndicate, and another for special shapes, but no practical result has as yet been reached.

During the year a syndicate was formed to control galvanized sheets, with the object of arriving at a comptoir that would actually handle sales. The hoop and band syndicate was reconstituted at the same time as the international hoop and band syndicate, April 1, and a syndicate for light railroad track material was organized and functioned as from June.

One of the most important features of the year was the attempt to organize retail sales. An almost unanimous agreement has been reached with the various merchant jobbers and warehousemen, but this does not imply that the imposed regulations are strictly respected. The principle of this organization is along the following lines, the object having been to regulate the sales of rolled products effected by merchants and warehousemen.

Retail Control Is Attempted

Prices of products at the warehouse must be the prices of the comptoir, with certain increases for freight rates and extras. Thus, merchant houses that are affiliated with the comptoir must undertake to supply themeslves exclusively from the comptoir, or from the Saar works, or from rerollers who have signed the agreement with the Comptoir Siderurgique de France. Merchants who follow these conditions are entitled to rebates in relation to the annual tonnage which they have ordered, and they can sell direct to their own customers and receive a commission on such sales.

It is generally expected that if these conditions had been scrupulously followed, the position of the comptoirs would have been strengthened, because if retail trade is properly regulated, this goes a long way to facilitate the control of production. However, and particularly in the Paris district, prices fixed by the comptoirs were far from being fol-

French Business Progress in 1933

(Metric tons — 000 — omitted)

	PRODUCTION*					IMPORTS††			EXPORTS††	
ave.	Iron ore	Coke†	Pig iron and ferro-alloys	No. fur-‡ naces in blast	Steel ingots and castings	Coke	Pig iron and ferro-alloys	Steel§	Pig iron and ferro-alloys	Steel§
1913.....	3,588	336	756	195	581	256	4.2	10	9	51
1930.....	4,048	421	836	137	787	380	14.0	21	21	273
1931.....	3,213	377	683	90	652	283	7.4	20	36	255
1932.....	2,300	277	461	81	470	164	3.7	14	17	183
1933										
Jan.....	2,346	316	488	81	504	142	3.0	21	17	175
Feb.....	2,265	298	452	82	495	172	8.0	16	17	205
March.....	2,572	329	525	85	586	160	7.0	17	15	213
April.....	2,375	300	516	87	554	195	13.0	16	13	209
May.....	2,634	307	555	91	592	192	10.0	17	15	235
June.....	2,555	302	551	92	585	200	5.0	19	16	224
July.....	2,581	321	570	92	581	208	7.0	21	16	234
Aug.....	2,667	332	564	91	565	209	8.0	17	15	207
Sept.....	2,638	329	538	91	551	206	10.0	15	15	194
Oct.....	2,599	339	537	90	527	199	12.0	10	15	198
Mo. ave....	2,523	317	530	90	554	188	8.3	17	15	209

*Production for 1913 is for France in her present boundaries. †Coke production at the coal mines. In addition, the iron and steel works produce about 3,500,000 tons annually. ‡On last day of year, or month. §Includes ingots, semifinished steel, all rolled products, forgings and scrap. ††Import and export figures are inclusive of the Saar district.

lowed, as is shown by the fact that reinforced concrete bars have been sold at from 600 to 620 francs per metric ton, against the comptoir price of 700 francs.

As a consequence of these infractions, the works themselves have occasionally granted unauthorized rebates to merchant firms, while, on the other hand, rerollers taking advantage of the relatively high prices fixed by the comptoirs have been active and have inundated the market with rolled steel at comparatively low prices. The works themselves have sometimes been able to avoid the strict conditions imposed by the comptoirs by rolling shapes with a new profile and by manufacturing specialties which are not controlled, such as gray beams.

To sum up the situation, French production is organized, but it cannot be said to be disciplined. The system of control operated by the comptoirs to see that their conditions are fulfilled has proved insufficient to avoid infractions, and it is generally expected that the only means to remedy the situation is to establish syndicates that will themselves handle the sales of the products they control; but for rolled products there are numerous difficulties in the way, which prevent the realization of such a scheme.

There has been considerable competition on the part of the Saar works, and although they are committed to follow the price policy of the French works and to accept the control of the French Comite des Forges of the Saar district, they have often been able to evade so doing. Those comptoirs in France which do handle sales, such as the wire rod syndicate, the semifinished steel syndicate and the structural steel syndicate, have operated satisfactorily.

The wire products syndicate (IWECO) functioned neither better nor worse in 1933 than in 1932, but it is generally considered that this organization is better than complete freedom and it is recognized that the wire products market has remained firm and healthy.

Generally speaking, domestic iron and steel prices in France have been stable, and any changes have been toward an increase. The price of 2-inch billets, which was 30 francs per metric ton in January, rose to 385 francs in April and 405 francs in May. The price of beams remained at 550 francs throughout the year, and the price of wire rod at 715 francs. Merchant bars were 530 francs in January, and in May 560 francs.

Foreign Trade Balance Adverse

All these prices are for basic bessemer steel. The increase in the price of merchant bars was made against strong opposition on the part of consumers, but the price increase policy was vindicated, since in May and June a large number of orders were booked. After the summer the market quieted down, and on many occasions unofficial rebates were granted.

Generally speaking, French exports were unsatisfactory, and a considerable deficit in the general balance of trade was registered during 1933, reaching 8,135,344,000 francs for the first nine months, compared with 7,543,000 francs in the corresponding period of 1932.

While the above features present a sombre picture of economic conditions in France, the results for 1933, at least insofar as iron and steel works are concerned, may not be so unfavorable as might be expected. The works gradually adapted themselves to the difficult period and have reorganized themselves and reduced in every possible way their overhead charges.

Therefore, it is expected that the financial year 1933 will close without any considerable losses. Only one large concern failed during the year, Societe Lorraine Miniere et Metallurgique, and this has been kept going at reduced capacity under the guidance of the Comptoir Siderugique de France, which thus offers the assistance of the whole industry.

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Year Ends Worse Than It Began For Belgium

European Staff Special

THE disequilibrium between production and distribution which has been a feature of the world depression had a serious effect on the Belgian iron and steel industries in 1933.

The year started fairly satisfactorily, as there were relatively active transactions on the part of the Far East and Japan, due mainly to the threatening war between those two interests. However, this factor soon disappeared, and a sudden drop in export prices followed. Further confusion was thrown upon export markets due to the course of the South African pound and the Canadian dollar.

Concurrently with these events, negotiations conducted to organize international comptoirs were not proceeding smoothly, with a resulting unsatisfactory influence on the confidence of consumers. Conditions were worsened by the depreciation of the American dollar, the first effects of which were not very noticeable, but when it was rumored that America would follow an inflationist policy, Continental manufacturers reduced their prices in order to meet American competition.

Severe Competition Encountered

A drop of 10 per cent was registered, particularly for indented concrete bars and for angles. On overseas markets, and especially in South America, American competition was keen. The comptoirs were thus obliged to establish prices with a view to enabling manufactures to compete against the United States, particularly in the Far East and more especially in Japan.

New competition also made its appearance in other directions, particularly in Japan, and soon sales of Japanese finished products, especially wire products and nails, were noted in European markets. Such competition was often met in Germany, where there is a considerable difference between domestic and export prices.

Great Britain also competed in export markets in respect of machinery and structural steel, bridgework, etc., and the Belgian state railroad actually passed a contract for locomotive crankshafts to a British firm. Italy also competed in export markets with heavy steel products.

This intensified competition on the part of other countries in foreign markets compelled Belgian works to reduce production costs and to rationalize production, and it broke down the resistance of a number of producers against the establishment of syndicates for export trade.

Before export selling syndicates could be organized, it was necessary to establish a domestic organization similar to the Comptoir Siderurgique in France and the Stahlwerksverband in Germany. Eventually a Belgian comptoir was formed under the name of "Cosibel" and was subdivided into four syndicates, one for each of the following products: Structural steel, merchant bars, semifinished steel, plates and sheets. Following this event, international selling syndicates were organized as from June 1.

Generally speaking, these international selling syndicates are set up as follows: Controlling the whole organization is the directing committee of the Entente Internationale de l'Acier, the Steel Entente, which decides in the last resort on all questions concerning production. The syndicates themselves are headed by an executive committee, which comprises three delegates for each international group, this committee being presided over by M. Dieudonne, of the Arbed.

The head office of the executive committee is thus in Luxemburg, as is also the central office of the European steel entente. The executive committee decides all questions of principle, including price policy, methods of payment, relations between the syndicates and exporting firms, interpretation of bye-rules, the composition of managing committees and quotas.

Each syndicate is headed by a managing committee, which takes care of routine work in accordance with instructions issued by the executive committee. Each national group is responsible for the sales of its own members. The archives of each international syndicate are kept by one of the international groups. The French group is responsible for the structural steel syndicate, the Belgian for the semifinished steel syndicate, the Luxemburg for the merchant bar syndicate, and the German for the plate and sheet syndicate.

Quotas allocated to each country were based on the 22 months extending from the latter part of 1928 up to the first half of 1932. On this basis the French and German groups enjoyed a slightly better position than the other groups, and it was, therefore, decided that both the French and German groups should credit back to the other groups a certain percentage during the first two years of the life of the syndicates. A special arrangement was made with respect to the Luxemburg group, which continues in force until the total volume of exports remains under 6,800,000 tons per year.

Syndicate Has Weak Points

This agreement, which binds members of the international selling syndicates, was signed up to June, 1935, and there is a suspension clause which may become operative when the regime of the Saar district is modified. Sales are effected through a number of exporting firms and through the selling agencies belonging to the steelworks. This has resulted in a number of exporting firms being sacrificed, and this is one of the weak points of the organization.

Another unfavorable factor in the syndicate organization is that the Forges de Clabecq, of Belgium, only adhered provisionally to the syndicates up to Dec. 31, 1933. At the recent annual general meeting of this

(*Please turn to Page* 174)

Belgian and Luxemburg Business Progress in 1933

(Metric tons — 000 omitted)

	PRODUCTION					IMPORTS		EXPORTS	
		Belgium		Luxemburg		Belgium and Luxemburg			
Mo. ave.	Coke	Pig iron and ferro-alloys	Steel ingots and castings	Pig iron and ferro-alloys	Steel ingots and castings	Pig iron	Steel‡	Pig iron	Steel‡
1913.....	294	207	206	212	98	48†	26†	1.4†	130†
1930.....	447	283	282	206	189	33	28	9.6	343
1931.....	411	269	260	171	170	25	30	5.8	316
1932.....	373	232	234	163	163	17	18	3.0	285
1933									
Jan.....	379	249	245	166	163	18	17	3.0	271
Feb.....	362	225	234	167	166	19	18	2.9	302
March....	383	246	258	177	176	18	18	3.1	334
April.....	361	230	230	170	168	11	13	3.3	284
May.....	386	252	270	172	174	23	27	2.1	319
June.....	376	230	232	156	154	22	21	2.2	312
July.....	406	225	212	154	148	22	20	2.9	247
Aug.....	385	223	215	143	140	21	10	3.7	243
Sept.....	376	209	212	140	135	20	10	5.0	270
Oct.....	377	220	194	143	136	...	...	...	...
Mo. ave..	379	231	230	160	156	19	17	3.1	287

†Belgium only. ‡Includes iron castings and scrap.

Italian Industries To Be Under More Strict Control

BY DR. GUIDO VANZETTI
Special Correspondent, STEEL

ESTIMATED output of steel in Italy in 1933 was 1,800,000 metric tons, an increase to 130 per cent of 1932 production, about 84 per cent of the maximum attained in 1929, and 60 per cent of the 3,000,000-ton capacity of Italian works.

Pig iron showed an increase to 111 per cent of 1932 production, with 550,000 metric tons. This is 68 per cent of the rated capacity of 800,000 metric tons annually and 76 per cent of the maximum attained in 1929.

Output of rolled products followed the increase of production of steel, and it is probable that for 1933 the output will be 1,485,000 metric tons, corresponding to 120 per cent of the 1932 production and 71 per cent of the record output of 1929.

The total of ferroalloys also increased and for 1933 a tonnage of 48,500 metric tons is expected, which would be 174 per cent of the 1932 output and 93 per cent of that of 1929.

This increase in the production of iron and steel has caused a larger tonnage of scrap to be used in Italy, and, therefore, imports of scrap increased in comparison with those of 1932. For the first eight months of the past year, imports of scrap were 374,800 metric tons, against 315,000 tons in the corresponding period of 1932. The increased demand for scrap has resulted in scrap prices being firmer in 1933 than in the preceding year, although they have not increased considerably.

During the first eight months of 1933, imports of pig iron and ferroalloys amounted to 34,262 metric tons, compared with 30,000 tons in the corresponding period of 1932. In the same period, imports of steel products totaled 130,000 metric tons, against 110,000 tons in the first eight months of 1932.

Voluntary Syndicate Formed

Prices of rolled products, as established by the Unione Siderurgica Italiana, showed little variation in comparison with the level of 1932, with the exception of a few types of products for which there was a rise of from 2 to 3 per cent.

The committee of experts which was appointed by the government in 1932 had concluded its investigations at the end of that year. It had pointed to the necessity of renewing the life of the Union, and had proposed a scheme for establishing quotas. This syndicate was, therefore, renewed at the end of February, 1933, the new term expiring at the end of 1937.

While the previous syndicate had been formed under compulsion, this was not the case with respect to the new one; but the government did exert a certain amount of pressure in order to bring the negotiations to a successful conclusion. As the by-laws of this syndicate are not yet definitely established, it is being conducted along the same lines as previously.

Concurrently with the Unione Siderurgica Italiana are a number of syndicates handling the sales of steel tubes, plates and sheets, tin plate, special sheets, and a new one has recently been formed for the sales of

(*Please turn to Page* 174)

THE SHENANGO FURNACE CO.

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Central Europe Nearing Its Turning Point

BY DR. JAN TILLE

Special Correspondent, STEEL

REDUCTION in the output of pig iron and raw steel that had set in since 1929 in Central Europe came at last to a standstill in 1933, with the sole exception of Hungary. Czecho-Slovakia has a slight increase to show, while Poland's output has grown considerably. On the other hand, the situation in Austria has remained practically unchanged.

In 1932, Czecho-Slovakia suffered a considerable reduction in its raw steel output as compared with 1929, production in 1932 being only 32 per cent of the 1929 output. The reason for this fall is to be sought in the lack of export business, which suffered an almost complete setback, owing to the collapse of prices in world markets, while in 1929, export business had amounted to nearly 50 per cent, and in 1930 to over 50 per cent of the total output.

The home market likewise weakened considerably, although not nearly so much as the export markets. Decreased sales in the Czecho-Slovak home market are due to a great restriction of building activities and to lack of employment in the manufacturing industries using iron and steel. During 1933 the position improved. Output of raw steel increased by about 20 per cent over 1932, the increase being mostly during the summer months and toward the end of the year.

Russian Buying An Aid

Export business also showed some signs of revival from September onward. Exports to Russia, which had practically ceased after the quite considerable deliveries from 1929 to 1931, were partly resumed again in the latter part of 1933, although the quantities exported up to October amounted only to about 10,000 tons of rolled products; but from October to the middle of November, the Vitkovice works alone booked 8700 tons of plates and sheets and 6500 tons of rails from Russia. The outlook at the end of the year was more promising than at the beginning. Investments, both in the industry and in other undertakings, are still greatly restricted, owing to the necessity for the strictest economy.

On Nov. 1, a cartel control act became effective, but it is, of course, impossible as yet to form any definite opinion as to the consequences this new act will have. The government's endeavors to bring about a reduction in prices have caused would-be purchasers to exercise serious restraint in the placing of orders. Czecho-Slovakia remains a member of a number of international cartels, viz. IRMA (International Rail-Makers' Association), IWV (Internationaler Walzdrahtvervand or International Wire Rod Syndicate), and IWECO (International Wire Export Company).

In Poland, output in 1933 was considerably higher than in 1932, the excess being about 50 per cent. With the assistance of the government, in the form of export bonuses and state guarantees for export busi-

ness, it has been possible to secure some large Russian orders. By the middle of 1933, not only had domestic trade increased, but the volume of exports was about three times the amount exported in the corresponding period of 1932. Polish iron and steel works are not members of the international cartels, but, on the other hand, in their own country they are united in a syndicate, but Poland, like Czecho-Slovakia, has an act controlling cartels, which act, however, has not as yet brought about any changes in the general situation.

During the first half of 1933, blast furnaces in Austria were temporarily extinguished. Later, however, they were started up, but they still are being operated at considerably below their full capacity, although producing relatively more than in the corresponding months of 1932. Production of raw steel has also increased. By September, the position had improved, and the output of steel was about 50 per cent of capacity.

In Hungary, output still is falling, it having been found necessary to restrict export activities on account of the disastrously low prices ruling in world markets. Today's production of raw steel in Hungary totals barely 30 per cent of 1929. Austria and Hungary are affiliated to the international iron and steel syndicates.

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FABRICATING MACHINERY

SPECIAL MACHINERY

Year Ends Worse Than It Began for Belgium

(*Concluded from Page* 171)

company, the chairman announced that after four months' participation in the entente and in the syndicates, the production of the Clabecq works had considerably decreased, with a resulting increase in production costs, and causing the concern to put a number of men out of work. He stated that if the situation does not improve, the Clabecq concern will refrain from definitely joining the entente, and this would create a difficult position.

Following the constitution of the selling syndicates, a marked increase was made in the export prices of the controlled products. Two-inch billets, which were quoted at only £1 19s at the beginning of January, saw their price fixed at £2 7s June 1, and they have remained at that level since.

Merchant bars, which were only £2 8s Jan. 1, were prices at £3 June 1, and a further increase of 2s 6d for a number of markets was made at the end of the year. Beams were only £2 1s Jan. 1; their price was fixed at £2 15s June 1, and this price was increased by 2s 6d at the end of the year. All prices quoted are in gold pounds.

Italian Industry To Be Under Stricter Control

(*Concluded from Page* 172)

nuts and bolts. Although negotiations have been carried on for some time with a view to organizing a syndicate for steel castings, no results have as yet been obtained.

It is anticipated that a number of radical measures will be instituted during the course of this year in order further to control the Italian iron and steel market. For a number of years the iron and steel industries were operating under conditions of free competition, and during the recent critical years they had to apply to the government for assistance in the form of subsidies or tariff protection.

Now, the regime of free competition can be considered as terminated, and it is proposed that the state shall intervene in order to supervise the complete reorganization of the Italian industries.

The steps to be taken will result in nothing less than a modification of the constitution of the state, and it is expected that a new body will be instituted which will replace the chamber of deputies and which will comprise representatives of agriculture, industry and commerce.

One of the duties of this body will be to discipline national production, and such a measure will be of considerable import as regards the iron and steel industry.

ADVERTISING PAGES REMOVED

Peak Shipments Sustain Steelworks Rate

Little Change in Operations, Except for Holidays—Few Specifications Unfilled, Despite Cold and Car Shortages—Loans Assure Large Rail Orders

BARRING suspensions for the three-day holiday periods at Christmas and New Year, the general average of steelworks operations on working days last week showed little change from 38 per cent.

Shipments reached a peak rarely exceeded in a year's final week, even in the most prosperous times. Severe weather conditions throughout the greater portion of the country, and car shortages in many districts, complicated deliveries. But mills were forced to default on few specifications accepted for shipment by Dec. 31.

Early January will show a paucity of specifications from those lines which recently have supplied the largest tonnage, due to price advances effective Jan. 1. Manufacturing for stock is expected to make up considerable of the deficiency. In some finished products, unaffected by code regulations, notably nuts and bolts, shipments this month will be heavier than those in December.

During the late December rush for material, automotive specifications were slow in coming out. December automobile production was lower than anticipated, thus throwing a considerable portion of the industry's steel requirements into January. Much of the pent-up requirements for railroads and public construction is maturing.

Plan To Smooth Out Irregularities in Operations Generated by Steel Code

While the rigid deadline on steel shipments has proved satisfactory insofar as merchandising is concerned, it is believed to be uneconomical from an operating standpoint, and several proposals already are before the industry to alleviate this situation.

The first of these is to permit 20 to 30 per cent of the tonnage which ordinarily would fall due in the last month of a quarter to be shipped in the first month of the succeeding period. The second is to abolish quarterly contracts, and to substitute semiannual commitments. The third, previously mentioned, is to name quarterly prices two or two and a half months in advance.

PWA loans aggregating $27,534,000 to six carriers, approved last week, mean the financing wholly or in part of 110,000 tons of rails and commensurate fastenings, and repair work, as follows: Southern Pacific, 45,000 tons of rails and 13,000 tons of fastenings; Baltimore & Ohio, 50,000 tons of rails; Wabash, 10,000 tons of rails, and repair work; Kansas, Oklahoma & Gulf, 5200 tons of rails and a tonnage of fastenings.

Illinois Central receives $9,300,000 of the total to repair freight and passenger cars, to lay rails and rebuild Ohio river viaducts; and Interstate of Virginia, $250,000 for miscellaneous work.

More than 8000 freight cars, 133 locomotives, and 30 coaches are required by railroads which applied for PWA loans last week. New York, New Haven & Hartford asked for a loan to buy 25,000 tons of rails and 10,000 tons of fastenings. Central of Georgia has placed 3000 tons of rails and 200 coal cars; and Delaware, Lackawanna & Western, 3000 tons of fastenings.

Structural Shape Awards Hold Up; Scrap, More Active, Continues To Advance

Structural shape awards for the final week, 13,417 tons, were only 2000 tons below the weekly average for the year. In the New York metropolitan district 20,000 tons are up for early purchase. California has voted $170,000,000 for a central valley water project requiring 11,000 tons of structural material. For air-conditioning equipment in Washington public buildings, $1,000,000 has been alloted, this requiring a large tonnage of sheets.

Markets for raw materials continue strong. In pig iron, heavy shipments have depleted furnace stocks, which will tend to support furnace operations in January. In scrap, prices still are rising, on more active demand. Contracting for ferroalloys is brisk, and sellers are protecting themselves against variations in the value of the dollar, and excise and special taxes.

Holiday influences also are weighing more lightly than usual on the European iron and steel industry, and the outlook for early 1934 is brighter, according to STEEL's London cablegram.

With adjustments made so far as possible for holiday suspensions, steelworks operations last week were down 2 points to 36 per cent. Youngstown was off 1 point to 38, Cleveland 5 to 52, Pittsburgh 2 to 27, Wheeling 10 to 41, eastern Pennsylvania 1½ to 24½, and Buffalo 1 to 37. Detroit was unchanged at 52, New England 72, Chicago 40, and Birmingham 52.

STEEL's iron and steel composite remains $32.42; the finished steel composite, $51.10; while the scrap index is up 20 cents to $10.70.

COMPOSITE MARKET AVERAGES

	Dec. 30	Dec. 23	One Month Ago Dec., 1933	Three Months Ago Oct., 1933	One Year Ago Jan., 1933	Ten Years Ago Jan., 1924
Iron and Steel Composite	$32.42	$32.42	$32.42	$31.59	$28.68	$43.26
Finished Steel Composite	51.10	51.10	51.10	49.20	46.13	67.71
Steelworks Scrap Composite	10.70	10.50	10.12	10.37	6.23	18.23

Iron and Steel Composite:—Pig iron, billets, slabs, sheet bars, wire rods, tin plate, nails, sheets, plates, shapes, bars, and black pipe. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

	Dec. 30, 1933	Dec. 1933	Oct. 1933	Jan. 1933
Finished Material				
Steel bars, Pittsburgh	1.75	1.75	1.75	1.60
Steel bars, Chicago	1.80	1.80	1.80	1.70
Steel bars, Philadelphia	2.04	2.04	2.04	1.91
Iron bars, Chicago	1.60	1.60	1.60	1.65
Shapes, Pittsburgh	1.70	1.70	1.70	1.60
Shapes, Philadelphia	1.90	1.90½	1.90½	1.70
Shapes, Chicago	1.75	1.75	1.75	1.70
Tank plates, Pittsburgh	1.70	1.70	1.70	1.60
Tank plates, Philadelphia	1.88	1.88½	1.88½	1.66
Tank plates, Chicago	1.75	1.75	1.75	1.70
Sheets, No. 10, hot rolled, Pitts.	1.75	1.75	1.75	1.65
Sheets, No. 24, hot ann., Pitts.	2.25	2.25	2.25	2.05
Sheets, No. 24, galvan., Pitts.	2.85	2.85	2.85	2.70
Sheets, No. 10, blue anneal., Gary	1.85	1.85	1.85	1.85
Sheets, No. 24, hot anneal., Gary	2.35	2.35	2.35	2.25
Sheets, No. 24, galvan., Gary	2.95	2.95	2.95	2.85
Plain wire, Pittsburgh	2.20	2.20	2.10	2.15
Tin plate, per base box, Pitts.	5.25	5.25	4.65	4.25
Wire nails Pittsburgh	2.35	2.35	2.10	1.90
Semifinished Material				
Sheet bars, open-hearth, Youngs.	26.00	26.00	26.00	26.00
Sheet bars, open-hearth, Pitts.	26.00	26.00	26.00	26.00
Billets, open-hearth, Pittsburgh	26.00	26.00	26.00	26.00
Wire rods, Pittsburgh	36.00	36.00	35.00	36.20

	Dec. 30, 1933	Dec. 1933	Oct. 1933	Jan. 1933
Pig Iron				
Bessemer, del. Pittsburgh	19.26	19.26	19.26	15.76
Basic, valley	17.00	17.00	17.00	14.00
Basic, eastern, del. eastern Pa.	18.76	18.76	17.76	13.50
No. 2 foundry, del. Pittsburgh	18.76	18.76	18.76	15.76
No. 2 foundry, Chicago	17.50	17.50	17.50	15.50
Southern No. 2, Birmingham	13.50	13.50	13.50	11.00
No. 2X, Eastern, del. Phila.	19.63	19.63	18.63	13.76
Malleable, valley	17.50	17.50	17.50	14.50
Malleable, Chicago	17.50	17.50	17.50	15.50
Lake Superior charcoal, del. Chi.	23.54	23.54	23.54	23.04
Gray forge, del. Pittsburgh	18.38	18.38	18.38	15.63
Ferromanganese, del. Pittsburgh	90.24	87.24	87.24	73.24
Scrap				
Heavy melting steel, Pittsburgh	$12.75	12.20	12.45	8.35
Heavy melting steel, eastern Pa.	11.00	10.25	10.19	6.50
Heavy melting steel, Chicago	9.75	9.00	9.35	5.25
No. 1 wrought, eastern Pa.	11.75	11.00	10.75	6.50
No. 1 wrought, Chicago	8.70	8.45	9.10	5.00
Rails for rolling, Chicago	10.75	10.35	11.10	8.05
Coke				
Connellsville, furnace, ovens	3.75	3.75	3.25	1.75
Connellsville, foundry, ovens	4.25	4 25	3.85	2.50

Steel, Iron, Raw Material and Metals Prices

Prices conform to American Iron and Steel institute schedules. Asterisks denote price changes this week

Sheet Steel

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.75c
Gary, base	1.85c
Chicago, del.	1.88c
New York, del.	2.08c
Philadelphia, del.	2.04c
Birmingham, base	1.90c
St. Louis, del.	2.07c
F.o.b. cars, dock Pacific ports	2.42½c

HOT ROLLED ANN. No. 24

Pittsburgh, base	2.25c
Gary, base	2.35c
Chicago, del.	2.38c
Detroit, del.	2.45c
New York, del.	2.58c
Philadelphia, del.	2.54c
Birmingham, base	2.40c
St. Louis, del	2.57c
F.o.b. cars, dock, Pacific ports	2.95c

GALVANIZED No. 24

Pittsburgh, base	2.85c
Gary, base	2.95c
Chicago, del.	2.98c
Philadelphia, del.	3.14c
New York, del.	3.18c
Birmingham, base	3.00c
St. Louis, del	3.17c
San Francisco, f.o.b. cars, dock	3.55c

TIN MILL BLACK No. 28

Pittsburgh, base	2.65c
Gary, base	2.75c
St. Louis, del.	2.97c

COLD ROLLED No. 10

Pittsburgh, base	2.30c
Detroit, delivered	2.50c
Gary, base	2.40c
Philadelphia, del.	2.59c
New York, del.	2.63c

COLD ROLLED No. 20

Pittsburgh, base	2.75c
Detroit, base	2.95c
Gary, base	2.85c
Philadelphia, del.	3.04c
New York, del.	3.08c

ENAMELING SHEETS

Pittsburgh, No. 10	2.45c
Pittsburgh, No. 20	2.90c

Tin and Terne Plate

Per 100-lb. box, Pittsburgh. Gary base, 10 cents higher

Tin plate, coke base, contract	$5.25
Do., stock	4.55
Long ternes, No. 24 unassorted	3.25c

Corrosion and Heat Resistant Alloys

Base, Pittsburgh

18% chrome, 8% nickel; sheets, 35c; plates, 28c; bars, 24c; hot-rolled strip, 24.50c; cold-rolled strip, 32.00c.

	A	B	C	D
Bars	17c	18.5c	21c	26c
Plates	20c	21.5c	24c	29c
Sheets	25c	28c	31c	35c
Hot strip	17c	18.5c	21c	26c
Cold strip	22.5c	24c	27c	35c

Carbon 0.12 and under; no nickel. A has chrome 15% and under. B over 15/18% inc., C over 19/23% inc., D over 23/30%.

Steel Plates

Pittsburgh, base	1.70c
New York, del.	1.98c
Philadelphia, del	1.88½c
Boston, del.	2.10c
Buffalo, del	1.93½c
Chicago, base	1.75c
Cleveland, del.	1.88½c
Birmingham, base	1.85c
Coatesville, base	1.80c
Sparrow's Pt., base	1.80c
Pacific Coast, f.o.b. cars, dock	2.25c
St. Louis, del	1.97c

Structural Shapes

Pittsburgh, base	1.70c
Philadelphia, del.	1.90½c
New York, del.	1.95½c
Boston, del.	2.08½c
Bethlehem, base	1.80c
Chicago, base	1.75c
Cleveland, del.	1.88½c
Buffalo, base	1.80c
Birmingham, base	1.85c
Pacific Coast, f.o.b. cars, dock	2.25c

Bars

SOFT STEEL

Pittsburgh, base	1.75c
Chicago, base	1.80c
Birmingham, base	1.90c
Buffalo, base	1.85c
Cleveland, base	1.80c
Detroit, del.	1.90c
Pacific Coast ports, cars, dock, c.i.f.	2.30c
Philadelphia, del.	2.04c
Boston, del.	2.19c
New York, del.	2.08c
Pitts., forg. qual.	1.75c-2.25c

RAIL STEEL
To Manufacturing Trade

Pittsburgh	1.65c
Chicago	1.70c
Cleveland	1.70c
Gary, Ind.	1.70c
Buffalo	1.75c

IRON

Terre Haute, Ind. base	1.60c
Philadelphia, base	1.74c
Pittsburgh, refined	2.75c-7.50c

REINFORCING
New billet, cut lengths, carlots

Pittsburgh	1.90c
Chicago, Gary, Buffalo, Cleve., Birm., Young	1.95c
Gulf ports	2.30c
Pacific coast ports	2.45c
Philadelphia, del.	2.19c

Rail steel

Pittsburgh, base	1.75c
Chicago, Buffalo, Cleveland, Birm., Young.	1.80c
Gulf ports	2.15c
Pacific coast ports	2.30c

Wire Products □ □

(Prices apply to straight or mixed carloads; pool cars, or less, 10c up. 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base, Pittsburgh-Cleveland
(Per 100-lb. keg)

Standard wire nails	$2.35
Cement coated nails	2.35
Galvanized nails, 15 gage and coarser	4.35c
Do., 16 gage and finer	4.85c

(Per pound)

Polished staples	3.05c
Galvanized fence staples	3.30c
Barbed wire, galv.	2.85c
Annealed fence wire	2.35c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$60.00
Plain wire, 6-9 gage to mfg trade	2.20c

Anderson, Ind., Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire	3.20c

Chicago and Waukegan $1 higher, Worcester $2 higher.

Cold-Finished Carbon Bars

Base Pitts., one size, shape, grade, shipment at one time to one destination

*10,000 to 19,999 lbs	2.10c
*20,000 to 59,999 lbs	2.05c
*60,000 to 99,999 lbs	2.00c
*100,000 lbs. and over	1.97½c

Chicago, Cleveland, Buffalo up 5c; Detroit up 20c; eastern Michigan up 25c.

Shafting □ □ □

Turned and ground, Pitts. base

*1⅛-inch	3.40c
*1⅛ to 1½-inch	2.90c
*1⅝ to 1⅞-inch	2.75c
*1⅛ to 2⅞-inch	2.60c
*2⅛ to 6-inch	2.45c

Alloy Steel Bars □

Hot rolled

Pittsburgh, Buffalo, Chicago, Massillon, Canton	2.45c
Bethlehem	2.55c

Alloy	Diff.	Alloy	Diff.
S.A.E.		S.A.E.	
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 .15 to .25 Mo.	0.50
4600 .20 to .30 Mo. 125-1.75 Ni.	1.05
5100 .80-1.10 Cr.	0.45
5100 Cr. spring	base
6100 bars	1.20
6100 spring	0.70
Cr., Ni., Van.	1.50
Carbon van	0.95
9250 carbon base plus extras	

Strip and Hoops □

Hot strip to 23⅛-in. Pittsburgh	1.75c
Do., Chicago	1.85c
Do., del. Detroit	1.95c
Do., del. Phila.	2.04c
Do., del. N. Y.	2.08c
Cooperage hoop, Pittsburgh	1.85c
Do., Chicago	1.95c
Cold-rolled strip, Pitts., Cleve.	2.40c
Worcester	2.60c

Rails, Track Material □

(Gross Ton)

Standard rails, mill	$36.37½
Relay rails, Pitts. 20-45 lbs.	$26.00
50-60 lbs.	$23.00
70-75 lbs.	$18.00
80-85 lbs.	$24.00
100 lbs.	$25.00
Light rails, billet qual., Pitts., Chi.	$32.00
Do., reroll. qual.	$31.00
Angle bars, mills	2.55c
Spikes, R. R., base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs., up $2; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons or more; diff. for less.

Bolts and Nuts □ □

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots. Dec. 1, 1932, lists.

CARRIAGE BOLTS

All sizes, cut thread	70 off
Rolled thread, ½ x 6 and smaller	70 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts	70 off
Tire bolts	60 off
Stove bolts, 70-25-10 off in pkgs.; 83 off in bulk, 5000 or more of a size.	
Rolled thread machine bolts, ½ x 6 and smaller,	70 off
Step bolts	66 off
Elevator bolts	66 off

NUTS

Semifinished	70 off

HEXAGON CAP SCREWS

Milled	80-10-10 off
Upset 1-in., smaller	85 off

SQUARE HEAD SET SCREWS

Upset, 1-in., smaller	75-10 off
Upset, larger than 1-in.	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c.l., Pittsburgh, Cleveland	2.75c
Struc., c.l., Chicago	2.85c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 10 off
Wrought washers, Pitts., Chi., Phila.	6.00-6.25 off

Cut Nails, Piling □

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more; no discount on size extras	$3.00
Do., less than 5 kegs; no discount on size extras	$3.15
Steel piling, Pittsburgh	2.00c
Steel piling, Chi., Buff.	2.10c

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD
Steel

In.	Blk.	Gal.
¼ and ⅜	57	38½
½	62	50½
¾	65½	55½
1—3	67½	58½

Iron

½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

LAP WELD
Steel

2	63½	54½
2½—3	66½	57½
3½—6	68½	59½
7 and 8	67½	57½
9 and 10	67	57

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½
9—12	38	24½

LINE PIPE
Steel

⅛-inch, butt weld	50½
¼—⅜, butt weld	56
½, butt weld	61
¾, butt weld	64½
1—3, butt weld	66½
2-inch, lap weld	62½
2½—3, lap weld	65½
3½—6, lap weld	67½
7—8, lap weld	66½

Iron

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe list. 8—12 inch no extra.

BOILER TUBES
C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3¾	50	3	17
4	52	3¾—3½	18
4½—6	42	4	20
1½	1	4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% discounts on steel and 10% on charcoal iron.

Lapwelded steel: Under 10,000 lbs., 6 pts. under base and one 5%; on 10,000 lbs. to carload, 4 pts, under base and two 5%. Quantity discounts same as for hot-rolled. Charcoal iron: Under 10,000 lbs., 2 pts. under base; on 10,000 lbs. to carload, base and one 5%.

SEAMLESS BOILER TUBES
Cold Drawn

2—2¼	27	3¼—3½	41
2½—2¾	34	4	46
3	38	4½, 5, 6	43

(On 1—1¾-inch sizes mechanical tubing dis. apply.)

Hot Rolled

2—2¼	33	3¼—3½	47
2½—2¾	40	4	49
3	44	4½, 5, 6	42

Quantity discounts: Under 10,000 lbs., 10 pts. and 5%; 10,000 to 24,999 lbs., 6 pts. and 5%; 25,000 lbs. to carload, 2 pts. and 5 and 5%; carload and over, base discount and 5 and 5%. No extra for lengths 24 ft. and under.

Seamless Tubing □

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe □

Class B. Pipe—Per Net Ton

6-in & over, Birm.	$36.00-37.00
4-in., Birm.	39.00-40.00
4-in., Chicago	47.00-48.00
6 to 24 in., Chicago	44.00-45.00
6-in. & over, east. fdy.	40.00
Do., 4-in.	43.00

Class A pipe $3 over Class B. Stnd, fitgs., Birm. base..$90.00

Six to 24-inch, fittings, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, 5 higher.

Semifinished Steel □

Prices Per Gross Ton

BILLETS AND BLOOMS
4 x 4 inch base

Pitts., Chi., Cleve., open-hth. & bess.	$26.00
Philadelphia	31.30
Forging, Pitts., Chi.	31.00

SHEET BARS

Pitts., Cleve., Yong.	26.00
Chicago	26.00
Canton, O.	26.00

SLABS

Pitts., Cleve., Yong.	26.00

WIRE RODS

Pitts., Cleveland	36.00
Chicago	36.00

SKELP

All grades, Pitts. and Chicago	1.60c

Coke □ □

Price Per Net Ton

BEEHIVE OVENS

Connellsville fur.	$3.75
Connelsville fdry.	4.25
*Connel. prem. fdry.	5.00- 5.25
New River fdry.	6.00
Wise county fdry.	4.25- 5.00
Wise county fur.	3.50- 4.25

BY-PRODUCT FOUNDRY

Newark, N. J., del.	8.71- 9.31
Chi. ov., outside del.	8.50
Chicago, del.	9.25
New England, del.	10.50
St. Louis, del.	9.25
Birmingham, ovens	5.00
Indianapolis, del.	8.75
Ashland, Ky., Connellsville basis	6.00
Portsmouth, ovens, Connellsville basis	6.00
Buffalo, ovens	7.50- 8.00
Detroit, ovens	8.00
Philadelphia, del.	9.00

Coke By-Products □

Per gallon, producers' plants.

Tank lots

	Spot
Pure benzol	$0.22
90 per cent benzol	0.22
Toluol	0.30
Solvent naphtha	0.26
Commercial xylol	0.26

Per lb. f.o.b. New York

Phenol (200 lb. drums)	0.163c
Do., (100 lb.)	0.173c

Per lb., producers' plants

Naphthalene flakes and balls	6.00- 7.25

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.25

Pig Iron

Delivered prices do not include switching charges except as noted. No 2 foundry iron is 1.75-2.25 silicon; 25-cent differentials apply for each 0.25 silicon above 2.25

Gross Tons

	No. 2 Fdry.	Malleable	Basic	Bessemer
Basing Points:				
Bethlehem, Pa.	$18.50	$19.00	$18.00	$19.50
Birdsboro, Pa.	18.50	19.00	18.00	19.50
Swedeland, Pa.	18.50	19.00	18.00	19.50
Sparrows Point, Md.	18.50	.....	18.00	.....
From Swedeland, Pa., del. to Phila.	19.26	19.76	18.76	.....
From Bethlehem, del. to Brooklyn	20.77	21.27	.....	.....
From Bethlehem, del. to Newark, N. J.	19.99	20.39	.....	.....
Basing Point:				
Everett, Mass.	18.50	19.00	18.00	19.50
From Everett, del. to Boston	19.00	19.50	18.50	20.00
Basing Point:				
Buffalo	17.50	18.00	16.50	18.50
From Buffalo, del. to Boston	19.00	19.50	18.50	20.00
Basing Points:				
Neville Island, Pa.	18.00	18.00	17.50	18.50
Sharpsville, Pa.	17.50	17.50	17.00	18.00
Youngstown, O.	17.50	17.50	17.00	18.00
From Neville Island, Pa., del. to Pittsburgh district	(Neville Island base, plus 63c to $1.13 switching charges)			
Basing Points:				
Erie, Pa.	17.50	18.00	17.00	18.50
Cleveland	17.50	17.50	17.00	18.00
Toledo, O.	17.50	17.50	17.00	18.00
Detroit	17.50	17.50	17.00	18.00
From Detroit, del. to Saginaw, Mich.	19.60	19.60	19.10	20.10
From Cleveland, del. to Akron, Canton, O.	18.76	18.76	18.26	19.26
From Toledo, del. to Mansfield, O.	19.26	19.26	18.76	19.76
Basing Point:				
Hamilton, O.	17.50	17.50	17.00	18.00
From Hamilton, del. to Cincinnati	18.51	18.51	18.01	19.01
Do., del. to Indianapolis	19.77	19.77	19.27	20.27
Basing Points:				
Duluth	18.00	18.00	.....	18.50
Chicago	17.50	17.50	17.00	18.00
Granite City, Ill.	17.50	18.00	17.00	.....
From Duluth, del. to St. Paul	19.94	19.94	.....	20.44
From Chicago, del. to Milwaukee	18.50	18.50	18.00	19.00
From Chicago, Toledo or Detroit, del. to Muskegon, Mich.	20.40	20.40	19.90	20.90
From Granite City, del. to St. Louis	(Granite City base, plus 50-cent switching charge			
Basing Point:				
Birmingham, Ala	13.50	.....	12.50	.....
From Birmingham, del. to:				
Boston	18.62	.....	18.12	.....
Newark, N. J.	19.58	.....	.....	.....
Brooklyn, N. Y.	20.39	.....	.....	.....
Baltimore	19.02	.....	18.52	.....
Philadelphia	18.88	.....	18.38	.....
Cleveland	19.64	.....	18.64	.....
Cincinnati	18.13	.....	17.13	.....
Chicago	18.16	.....	19.14	.....
St. Louis	17.62	.....	17.50	.....
Basing Point:				
Provo, Utah	16.50	.....	.....	.....

LOW PHOS.

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.—$23.00. Basing point: Johnson City, Tenn.—$23.00

Philadelphia, standard and copper bearing 24.13

GRAY FORGE		CHARCOAL	
Valley furnace	17.25	Lake Superior fur.	20.50
Pitts. dist. fur.	17.75	Do., del. Chicago	23.54

SILVERY

Jackson County, O., base; 6%—$22.25; 7—$23.25; 8—$24.25; 9—$25.25; 10—$26.25; 11—$27.75.

BESSEMER FERROSILICON

Jackson County, O., base; 10%—$27.25; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25.

Iron Ore □ □

LAKE SUPERIOR ORE

Gross ton, 51½% Lower Lake Ports

Old range bess.	$4.30
Mesabi bessemer	4.65
Old range nonbess.	4.65
Mesabi nonbess.	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents, unit, del. E. Pa.

Foundry and basic, 56-63% con.(nom.)	8.00- 9.00
Cop.-free low phos. 58-65% (nom.)	10.00-10.50

FOREIGN ORE

Cents per unit, f.a.s. Atlantic ports Anom.Q

Foreign manganiferous ore, 45-55% iron, 6-10% man.	10.00
No. Afr. low phos.	9.50
Swedish basic, 65%	9.00
Swedish low phos	9.50
Snapish No. Africa basic, 50 to 60%	9.00
Tungsten, spot, sh. ton unit, duty pd.	$14.00-14.25
N. F. fdy., 55%.....	7.00
Chrome ore 48% gross ton, c.i.f.....	$18.00

Manganese Ore □

(Nominal)

Prices, not including duty, cents per unit, cargo lots.

Caucasian, 52-55%	22.00
So. African, 52%....	21.00-22.00
So. Afr., 49-51%....	20.00-21.00
Indian, 58-50%	nominal
Indian, 48-50%	nominal

Refractories □ □

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pa., Ohio, Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	48.00

Second Quality

Pa., Ohio, Ill., Ky., Md., Mo., Ga., Ala.	40.00

MALLEABLE BUNG BRICK

All bases	50.00

SILICA BRICK

Pennsylvania	$45.00
Joliet, E. Chicago..	54.00
Birmingham, Ala....	55.00

MAGNESITE BRICK

Dead burned grain, Chester, Pa., Baltimore bases, net	40.00
Domes, Chewelah, Wash., base	22.00

Fluorspar □ □

85 and 5 per cent grade

Washed gravel, duey paid, tide, gross ton	$21.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$14.75-15.00

Ferroalloys □ □

(In dollars, except Ferrochrome)

*Ferromanganese, 78-82% tidewater, duty paid	85.00
* del. Pittsburgh....	90.24
*Spiegeleisen,19-20%, dom., fur., spot†	26.00
*Ferrosilicon, 50%, freight all., cl.	77.50
* Do., less carload..	85.00
* Do., 75 per cent....	126-130.00
Spot, $5 a ton higher.	
*Silicomang., 2½ carb.	90.00
* 2% carbon	95.00
* 1% carbon	105.00
*Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
*Do., spot del.	10.50
Ferrotungsten, stand., lb. cont.	1.16- 1.25
*Ferrovanadium, 35 to 40%, lb. cont., on analysis	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt., all., lb.	7.00
Do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19%, Rockdale, Tenn., basis; 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand, 50-60%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads. Quan. diff. apply.

Nonferrous Mill Products

F.o.b. mill base, cents per lb. except as specified. Copper, brass products based on 8.00c Con., copper

Steets	
Yellow brass (high	13.75
Copper, hot rolled..	15.00
Lead, cut, to jobbers	8.00
Zinc, 100-lb. base....	9.00
Tubes and Pipes	
High yellow brass..	16.25
Seamless copper.....	16.25
Rods	
High yellow brass..	12.25
Copper, hot rolled..	12.25
Anodes	
Copper, untrimmed	12.75
Wire	
Yellow brass (high)	14.25

Old Metals □ □

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
New York	4.37½-4.62½
Chicago	4.50- 5.00
Cleveland	4.75- 5.25
*St. Louis	4.75- 5.00
Heavy Copper and Wire	
New York	5.87½-6.12½
Chicago, No. 1	5.87½-6.12½
*Cleveland	5.50- 6.00
*St. Louis	5.25- 5.50
Composition Brass Borings	
New York	4.12½-4.37½
Light Copper	
New York	5.12½-5.37½
Chicago	4.62½- 4.75
*Cleveland	5.00
*St. Louis	4.50- 4.75
Light Brass	
Chicago	2.87½-3.12½
*Cleveland	2.75- 3.00
Lead	
New York	3.00- 3.25
*Cleveland	3.00- 3.25
Chicago	2.87½-3.12½
*St. Louis	2.75- 3.25
Zinc	
New York	2.25- 2.50
Cleveland	2.25- 2.50
Chicago	2.00- 2.25
St. Louis	2.25- 2.50
Aluminum	
Clips, soft, Cleve....	13.00-14.00
Borings, Cleveland..	5.50- 6.00
Mixed, cast Cleve...	8.25- 8.50
*Mixed, cast, St. L..	7.50- 8.00

Secondary Metals □

Brass ingot, 85-5-5-5	8.25
Remelt Al., No. 12..	12.00-12.50

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	9.00- 9.50
Boston dealers	5.75- 6.25
Buffalo, No. 1	9.25-10.00
Buffalo, No. 2	8.00- 8.50
Chicago	9.50-10.00
Cleveland, No. 1	9.00- 9.50
Cleveland, No. 2	8.50- 9.00
Detroit, No. 1	8.25- 8.75
Detroit, No. 2	7.25- 7.75
Eastern Pa.	11.00
Eastern Pa., No. 2	8.50- 9.00
Federal, Ill.	8.00- 8.50
Granite City, Ill.	8.50- 9.00
N. Y., deal. R. R.	8.00
N. Y., deal. No. 2	7.00
Pittsburgh, No. 1	12.50-13.00
St. Louis, No. 1 del.	9.50-10.00
Valleys, No. 1	12.50

COMPRESSED SHEETS

Buffalo, dealers	8.00- 8.50
Chicago, factory	8.00- 8.50
Cleveland	9.00- 9.50
Detroit	8.25- 8.75
E. Pa., new mat.	9.50-10.50
Pittsburgh	12.25-12.75
Valleys	12.00

BUNDLED SHEETS

Buffalo	5.50- 6.00
Cincinnati, del.	5.75- 6.25
Cleveland	6.25- 6.75
Pittsburgh	10.75-11.25
St. Louis	5.00- 5.50

SHEET CLIPPINGS LOOSE

Chicago	5.00- 5.25
Cincinnati	4.50- 5.00
Detroit	5.50- 6.00
St. Louis	4.50- 5.00

STEEL RAILS, SHORT

Birmingham	11.00-11.50
Boston, dealers	5.25- 5.50
Buffalo	12.00-12.50
Chicago (3 ft.)	11.00-11.50
Chicago (2 ft.)	12.00-12.50
Cincinnati, del.	11.00-11.50
Detroit	9.50-10.00
Pitts., (open-hearth 3 ft. and less	14.00-14.50
St. Louis	12.00-12.50

STOVE PLATE

Birmingham	7.00- 7.50
Boston, dealers	4.50- 4.75
Buffalo	9.00- 9.50
Chicago, net	6.50- 7.00
Cincinnati, dealers	6.00- 6.50
Detroit, net	4.50- 5.00
Eastern Pa.	8.50- 9.00
N. Y., deal. fdry	5.00- 5.50
St. Louis	6.50- 7.00

COUPLERS, SPRINGS

Buffalo	11.50-12.00
Chicago, springs	10.50-11.50
Eastern Pa.	13.00-13.50
Pittsburgh	14.00-14.50
St. Louis	10.25-10.75

ANGLE BARS—STEEL

Chicago	10.50-11.00
St. Louis	9.50-10.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	11.50-12.50
Cleveland, billet, bloom crops	12.50-13.50
Eastern Pa. crops	14.00-14.50
Pittsburgh, billet, bloom crops	16.00-16.50
Pittsburgh, sheet bar crops	14.00-14.50

FROGS, SWITCHES

Chicago	10.00-10.50
St. Louis	9.50-10.00

SHOVELING STEEL

Chicago	9.50-10.00
St. Louis	8.00- 8.50

RAILROAD WROUGHT

Birmingham	7.00- 8.00
Boston, dealers	2.00- 2.50
Buffalo, No. 1	7.00- 8.00
Buffalo, No. 2	9.50-10.00
Chicago, No. 1, net	7.50- 8.00
Chicago, No. 2	9.50-10.00
Cincinnati, No. 2	8.25- 8.75
Eastern Pa.	11.50-12.00
N. Y., No. 1 deal	7.00- 7.50
St. Louis, No. 1	6.00- 6.50
St. Louis, No. 2	8.50- 9.00

SPECIFICATION PIPE

Boston	4.25- 4.50
Eastern Pa.	9.00- 9.50
New York, dealers	4.75- 5.25

BUSHELING

Buffalo, No. 1	8.00- 8.50
Chicago, No. 1	7.50- 8.00
Cinci., No. 1 deal	6.00- 6.50
Cincinnati, No. 2	2.50- 3.00
Cleveland, No. 2	7.00- 7.50
Detroit, No. 1 new	7.00- 7.50
St. Louis, No. 1	6.50- 7.00
Valleys, new No. 1	11.00-11.50

MACHINE TURNINGS

Birmingham	3.50- 4.50
Boston, dealers	2.00- 2.25
Buffalo	6.25- 6.75
Chicago	6.00- 6.50
Cincinnati, dealers	4.75- 5.25
Cleveland	7.00- 7.50
Detroit	5.75- 6.25
Eastern Pa.	6.50- 7.00
New York, dealers	2.50- 3.00
Pittsburgh	8.50- 9.00
St. Louis	4.25- 4.75
Valleys	7.50- 8.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	1.75- 2.00
Buffalo	7.00- 7.50
Cincinnati, dealers	4.75- 5.25
Cleveland	7.00- 7.50
Detroit	6.25- 6.75
Eastern Pa.	6.00- 6.50
New York, dealers	2.00- 2.50
Pittsburgh	7.00- 7.50

CAST IRON BORINGS

Birming., plain	4.00- 4.50
Boston, chemical	8.50- 9.00
Boston, dealers	3.25- 3.50
Buffalo	7.00- 7.50
Chicago	6.00- 6.50
Cincinnati, dealers	4.75- 5.25
Cleveland	7.00- 7.50
Detroit	6.25- 6.75
E. Pa., chemical	12.00-15.00
New York, dealers	3.00
Pittsburgh	7.00- 7.50
St. Louis	4.00- 4.50

PIPE AND FLUES

Cincinnati, dealers	4.00- 4.50

RAILROAD GRATE BARS

Buffalo	5.00- 5.50
Chicago, net	7.00- 7.50
Cincinnati	4.75- 5.25
Eastern Pa.	7.50- 8.00
New York, dealers	4.25- 4.50
St. Louis	5.50- 6.00

FORGE FLASHINGS

Boston, dealers	3.75- 4.00
Buffalo	8.00- 8.50
Cleve., over 10 in	8.50- 9.00
Detroit	6.75- 7.25

FORGE SCRAP

Boston, dealers	3.75- 4.00
Chicago, heavy	10.50-11.00
Eastern Pa.	10.00-10.50

ARCH BARS, TRANSOMS

St. Louis	9.25- 9.75

AXLE TURNINGS

Boston, dealers	3.50- 3.75
Buffalo	7.50- 8.00
Chicago, elec. fur	9.00- 9.50
Cleveland	9.00- 9.50
Eastern Pa.	10.00-11.00
St. Louis	5.00- 5.50

STEEL CAR AXLES

Birmingham	11.00-11.50
Boston, ship. point	8.00- 8.50
Buffalo	10.00-11.00
Chicago, net	10.50-11.00
Eastern Pa.	14.00
St. Louis	11.00-11.50

SHAFTING

Boston, ship. point	9.50-10.00
Eastern Pa.	15.00-15.50
New York, dealers	9.50-10.00
St. Louis	9.00- 9.50

CAR WHEELS

Birmingham, iron	8.00- 9.00
Boston, iron deal	6.00- 6.50
Buffalo, iron	9.00- 9.50
Buffalo, steel	11.00-12.00
Chicago, iron	10.50-11.00
Chi., rolled steel	10.00-10.50
Cincinnati, iron	8.25- 8.75
Eastern Pa., iron	11.50-12.00
Eastern Pa., steel	13.00-13.50
Pittsburgh, iron	11.00-11.50
Pittsburgh, steel	14.00-14.50
St. Louis, iron	8.00- 8.50
St. Louis, steel	9.50-10.00

NO. 1 CAST SCRAP

Birmingham	9.00-10.00
Boston, No. 2	5.50- 5.75
Boston, tex. con	10.25-10.50
Buffalo, cupola	10.00-10.50
Buffalo, mach.	10.50-11.50
Chicago, agri. net	7.00- 7.50
Chicago, mach. net	8.50- 9.00
Chicago, railroad net	8.00- 8.50
Cinci., mach. cup	8.00- 8.50
Cleveland, cupola	9.00- 9.50
Detroit, net	7.50- 8.00
Eastern Pa., cupola	11.50-12.50
N. Y., cup. deal	6.00- 6.50
N. Y., del. local foundries	9.00- 9.50
Pittsburgh, cupola	12.50-13.00
San Francisco, del.	13.50-14.00
Seattle	4.50- 6.50
St. Louis, No. 1	8.00- 8.50
St. L., No. 1 mach.	8.50- 9.00

HEAVY CAST

Boston, del.	5.50- 6.00
Buffalo, break.	7.50- 8.00
Cleveland, break	6.75- 7.00
Detroit, break	6.00- 6.50
Detroit, auto net	8.75- 9.25
Eastern Pa.	11.00
N. Y., No. 1, deal	7.00- 7.25
N. Y., break. deal	6.75- 7.25
Pittsburgh	11.50-12.00

MALLEABLE

Boston, consum	12.00-12.25
Buffalo	10.50-11.50
Chicago, R. R.	10.00-10.50
Cinci., agri. del	8.00- 8.50
Cinci., R. R. del	8.50- 9.00
Cleveland, rail	11.00-11.50
Detroit, auto	7.50- 8.00
St. Louis, R. R.	8.50- 9.00
Eastern Pa., R. R.	11.50-12.50

RAILS FOR ROLLING

5 feet and over

Birmingham	10.00-11.00
Boston, dealers	7.00- 7.25
Buffalo	9.00- 9.50
Chicago	10.50-11.00
Eastern Pa.	12.50
New York, dealer	6.50- 7.00
St. Louis	10.50-11.00

LOCOMOTIVE TIRES

Chicago (cut)	10.50-11.00
St. Louis, No. 1	8.75- 9.25

LOW PHOS. PUNCHINGS

Buffalo	11.00-11.50
Chicago	12.00-12.50
Eastern Pa.	12.50-13.50
Pittsburgh	14.00-14.50

Nonferrous Metal Prices of the Week

Spot unless otherwise specified. Cents per pound

	Copper: Electro., del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead: New York	Lead: East St. L.	Zinc: St. L.	Aluminum 98-99%	Antimony Spot, N. Y.	Ingot Nickel
Dec. 23	8.25	8.37½	8.00	52.85	53.40	4.15	4.05	4.45	*22.90	7.25	35.00
Dec. 25—Holiday											
Dec. 26	8.25	8.37½	8.00	53.30	53.80	4.15	4.05	4.45	*22.90	7.25	35.00
Dec. 27	8.25	8.37½	8.00	52.75	53.25	4.15	4.05	4.35	*22.90	7.25	35.00
Dec. 28	8.25	8.37½	8.00	52.55	53.05	4.15	4.05	4.32½	*22.90	7.25	35.00

*Nominal quotation. Market range 19.90c to 22.90c.

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	
Baltimore* ..	2.75c
Boston††	2.90c
Buffalo	2.95c
Chattanooga..	3.26c
Chicago	2.90c
Cincinnati	3.10c
Cleveland	2.90c
Detroit	2.98½c
Houston	3.00c
Los Angeles..	3.40c
New Orleans	3.00c
New York‡(d)	3.17c
Pittsburgh	2.85c
Philadelphia*	2.75c
San Francisco	3.55c
Seattle	3.40c
St. Louis	3.14c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS	
Portland	3.40c
San. Fran.	3.55c
Baltimore*	2.75c
Baltimore* ...	2.60c
Chattanooga..	3.26c
Chicago	2.75c
Cincinnati	3.10c
Detroit	2.98½c
New York‡(d)	3.10c
Philadelphia*	2.75c
St. Louis	3.14c
Tulsa	3.25c

REINFORC. BARS	
Boston 2.75c-3.25c	
Buffalo	1.95c
Chattanooga..	3.26c
Chicago 1.95c-2.10c	
Cleveland (c)	1.97½c
Cincinnati	3.10c
Houston	3.00c
Los Ang., cl...	3.10c
New Orleans	3.00c
New York	3.17c
Philadelphia..	2.62½c
Pitts., plain...	3.00c
Pitts., twisted squares	3.12½c
Seattle	3.50c
St. Louis	3.29c
Tulsa	3.25c
Young. 2.30c-2.60c	

SHAPES	
Baltimore* ...	2.60c
Boston††	3.07c
Buffalo	3.20c
Chattanooga..	3.46c
Chicago	3.10c
Cincinnati	3.30c
Cleveland	3.21c
Detroit	3.30c
Houston	3.00c
Los Angeles..	3.40c
New Orleans	3.50c
New York(d)	3.27c
Philadelphia*	2.75c
Pittsburgh	3.05c
Portland	3.40c
San Francisco	3.50c
Seattle	3.40c
St. Louis	3.34c
St. Paul	3.25c
Tulsa	3.50c

PLATES	
Baltimore*	2.75c
Boston††	3.08c
Buffalo	3.20c
Chattanooga..	3.46c
Chicago	3.10c
Cincinnati	3.30c
Cleveland, ¼ in. and thicker.	3.21c
Cleve., ⅜-in.	3.20c
Detroit	3.30c
Det., ⅜-in.....	3.10c
Houston	3.00c
Los Angeles..	3.40c
New Orleans	3.50c
New York(d)	3.30c
Philadelphia*	2.75c
Phila. floor....	4.35c
Pittsburgh	3.05c
Portland	3.40c
San Fran.	3.50c
Seattle	3.40c
St. Louis	3.34c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE	
Baltimore* ..	2.95c
Boston††	2.90c
Buffalo	3.10c
Chattanooga..	3.26c
Chicago	2.95c
Cincinnati	3.10c
Cleveland	3.01c
Det., 8-10 ga.	3.03½c
Houston	3.60c
Los Angeles..	3.65c
New Orleans	3.50c
New York	3.17c
Portland	3.65c
Philadelphia*	2.95c
Pittsburgh	2.85c
San Fran.	3.75c
Seattle	3.65c
St. Louis 3.19c-3.36c	
St. Paul	3.45c
Tulsa	3 70c

NO. 24 BLACK	
Baltimore*†..	3.50c
Boston††	3.75c
Buffalo	3.25c
Chattanooga..	4.01c
Chicago	3.70c
Cincinnati	3.85c
Cleveland	3.76c
Detroit	3.78½c
Los Angeles..	4.15c
New York	3.65c
Philadelphia*†	3.40c
Pittsburgh	3.35c
Portland	4.25c
San Fran.	4.25c
Seattle	4.25c
St. Louis	3.94c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS	
Baltimore*†..	3.75c
Buffalo	4.00c
Boston	4.60c
Chattanooga..	4.61c
Chicago 4.20c-4.30c	
Cincinnati	4.45c
Cleveland	4.36c
Detroit	4.45c
Houston	3.57c
Los Angeles..	4.75c
New Orleans	4.35c
New York	4.25c
Pitts.** 3.90c-4.20c	
Portland	4.85c
San Fran.	4.85c
Seattle	4.85c
St. Louis	4.54c
St. Paul	4.19c
Tulsa	5.10c
Phila.*†	4.00c

BANDS	
Baltimore	3.05c
Boston††	3.15c
Buffalo	3.30c
Chattanooga..	3.71c
Chicago	3.20c
Cincinnati	3.35c
Cleveland	3.26c
Detroit, ⅜-in. and lighter	3.28½c
Houston	3.25c
Los Angeles..	3.80c
New Orleans	3.20c
New York(d)	3.42c
Philadelphia..	3.05c
Pittsburgh	3.10c
Portland	3.90c
San Fran.	3.15c
Seattle	3.90c
St. Paul	3.20c
Tulsa	3.45c
St. Louis	3.44c

HOOPS	
Baltimore	2.80c
Boston	4.15c
Buffalo	3.55c
Chicago	3.20c
Cincinnati	3.35c
Det., No. 14 and lighter	3.28½c
New York	3.42c
Philadelphia..	3.30c
Pittsburgh	3.75c
Seattle	5.40c
St. Paul	3.75c

COLD FIN. STEEL	
Baltimore (c)	3.56c
Boston 3.83c-4.33c	
Buffalo	3.25c
Chattanooga*	3.91c
Chicago	3.35c
Cincinnati	3.55c
Cleveland	3.40c
Detroit	3.40c
Los Ang.(f)..	5.95c
New Orleans	4.25c
New York...3.92c-4.42c	
Philadelphia..	3.73c
Pittsburgh	3.20c
Portland (f)..	4.75c
San Fran. (f)	5.95c
Seattle (f)....	4.75c
St. Paul	3.20c
St. Louis.....	3.44c
Tulsa	4.65c

COLD ROLL. STRIP	
Boston, 0.100-in., 500 lb. lots	5.20c
Buffalo	5.25c
Chicago (b)..	5.65c
Cincinnati	5.80c
Cleveland (b)	5.55c
Detroit	5.40c
Philadelphia..	4.55c
New York.....	4.55c
St. Louis	5.74c

(b) Net base, straightening, cutting, boxing, 1 ton or more.

(c) Plus mill, size and quantity extras.

(d) Minus quant. diff.

(e) New mill classif.

(f) Rounds only.

‡Domestic bars.

*Plus. quan. extras.

**Under 25 bundles.

*†50 or more bundles.

†New extras apply.

††Base 40,000 lbs., extras on less.

Prices at Detroit, Cleveland, Chicago, Pittsburgh, Cincinnati, Chattanooga, New York, Boston, St. Louis on heavier lines are subject to new quantity differentials:

399 pounds and less, up 50 cents; 400 to 9999 pounds, base; 10,000 to 19,999 pounds, 15 cents under; 20,000 to 39,999 pounds, 25 cents under; 40,000 pounds and over, 35 cents under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Dec. 28

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

PIG IRON	British gross tons U. K. ports £ s d		Continental Channel or North Sea ports, metric tons Gold parity, $4.8665 £ s d	
Foundry, 2.50-3.00 Silicon.	$14.89	2 18 6	$8.88	1 16 6
Basic bessemer.....	13.74	2 14 0*	7.30	1 10 0
Hematite, Phos. .03-.05....	15.27	3 0 0	....	.....
SEMIFINISHED STEEL				
Billets.....	$28.00	5 10 0	$11.44	2 7 0
Wire rods, No. 5 gage.....	39.70	7 16 0	21.90	4 10 0
FINISHED STEEL				
Standard rails.....	$39.45	7 15 0	$26.77	5 10 0
Merchant bars.....	1.59c	7 0 0	.69c	3 2 6
Structural shapes.....	1.67c	7 7 6	.63c	2 17 6
Plates, †¼ in. or 5 mm.....	1.82c	8 0 0	.89c	4 1 0
Sheets, black, 24 gage or 0.5 mm.....	2.10c	9 5 0	1.27c	5 15 0
Sheets, gal., 24 gage, corr...	2.55c	11 5 0	1.60c to 1.76c	7 5 0 to 8 0 0
Bands and strips.....	1.82c	8 0 0	.85c	3 17 6
Plain wire, base.....	2.10c	9 5 0	1.18c	5 7 6
Galvanized wire, base.....	2.50c	11 0 0	1.38c to 1.40c	6 5 6 to 6 7 6
Wire nails, base.....	2.72c	12 0 0	1.27c	5 15 0
Tin plate, box 108 lbs.....	$ 4.20	0 16 6	....	.....

British ferromanganese $82 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5.....	$15.91	3 2 6(a)	$13.12	215	$13.21	305	$23.39	63
Basic bessemer pig iron....	16.54	3 5 0(a)*	11.29	185	12.56	290	25.80	69.50
Furnace coke.....	3.82	0 15 0	7.32	120	4.76	110	7.15	19.25
Billets.....	28.00	5 10 0	24.71	405	19.05	440	35.82	96.50
Standard rails.....	1.87c	8 5 0	1.96c	700	2.20c	1,100(b)	2.22c	132
Merchant bars.....	1.73c	7 12 6	1.57c	560	1.07c	535	1.85c	110
Structural shapes.....	1.99c	8 15 0	1.54c	550	1.07c	535	1.81c	107.50
Plates, †¼-in. or 5 mm.....	1.93c	8 10 0	1.90c	680	1.35c	675	2.13c	127
Sheets, black.....	2.33c	10 5 0‖	2.38c	850‡	1.50c	750‡	2.42c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.....	2.89c	12 15 0	4.06c	1,450	3.00c	1,500	6.22c	370
Plain wire.....	2.10c	9 5 0	3.16c	1,130	2.20c	1,100	2.97c	177
Bands and strips.....	2.38c	10 10 0	1.82c	650	1.35c	675	2.13c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. a del. Middlesbrough. b Since January.

STEEL SPECIFICATIONS IN 1934

1934 will witness sales made on QUALITY—rather than on price.

1934 will witness steel specifications more exacting than ever. Inspection of semi-finished and finished product will be rigid.

1934 will witness greater demand for interior soundness—and surface excellence.

Therefore, the record of a 1933 production of over 3,000,000 tons made by the GATHMANN BIG-END-UP METHOD will be inspiring to steel plant executives who must meet the demands of the day. The record proves that sound steel can be made and is being produced in large tonnages with profit to the producers.

We invite you to ask for our recommendations for your practice.

4 PRIMARY REQUIREMENTS to good ingot molding practice.

1. That the ingot's top area is enough greater than its bottom to insure progressive solidification from bottom to top.

2. That the ingot is free to contract inwardly with a minimum of surface stress.

3. That the salient surfaces of the ingot be of such contour that they will not be decarburized in the soaking pits.

4. That the contour of the ingot be such that initial reduction in the mill will not unduly stress the adjacent unworked sides.

Modern Gathmann Ingot Molds provide these essentials.

THE GATHMANN ENGINEERING COMPANY

BALTIMORE MARYLAND

1934 marks the twenty-fifth year we have devoted to the betterment of steel. In modern Gathmann ingot mold designs are incorporated a quarter century of research and improvement.

Bars

Bar Prices, Page 178

Pittsburgh — Contracts for steel bars for first quarter are appearing, covering buyers' needs for both carbon and alloy bars. In addition, some spot tonnage was ordered last week with the understanding that first quarter prices would apply because shipment by Dec. 31 was impossible. Although the automotive trade was conspicuously not buying bars, nor other finished steel, before the Dec. 31 deadline, a few first quarter contracts from these buyers have made an appearance. Bars are now firmly quoted 1.75c base, Pittsburgh.

Cleveland — Bar producers here report fourth quarter contracts cleaned up by Dec. 31, and little tonnage canceled, either through consumers' failure to specify, or mills' inability to give delivery. Shipments in the past week were mainly of a miscellaneous character. Users are contracting for first quarter, but specifications for the first two weeks in January are expected to be slow.

Boston — Commercial steel bar specifications have dropped. Consumers took in fair shipments against contracts, anticipating the advance. On 117,000 pounds of nickel steel bars, Boston navy yard, 4.39c, delivered, was offered by most bidders.

Philadelphia—Because of heavy releases of soft steel bars in December the market is quiet at present. This is believed to be temporary.

Plates

Plate Prices, Page 178

Pittsburgh—Tankmakers are confident of considerable improvement early in 1934. Federal loans to municipalities for new tanks are now providing basis for busier estimating and undoubtedly will result in actual orders for shops.

A large part of the 160,000 tons of rolled steel for 12,000 freight cars which the Erie, Chesapeake & Ohio and Nickel Plate will buy is to be car plates. Purchase of this steel will be made by the successful car builder, likely late in January.

Plate producers have extended bids to car builders to figure on this inquiry for rolling stock and 1.70c, Pittsburgh, on plates has been firmly named as the base price, plus all extras.

Cleveland—Some consumers found the Dec. 31 deadline on shipments to their disadvantage, as owing to unforeseen business contingencies they were unable to specify on fourth quarter contracts in time to permit mills to ship the material. They now will be required to pay an advance of $2 per ton. Both producers and consumers believe some leeway should be provided under certain conditions, just as prices are guaranteed for specific fabricating jobs. Shipments during the week continued heavy, but new business was quiet.

Boston—Tank and boiler plate demand is heavier, with 450 tons placed for fuel tanks at Melville, R. I. Railroad and industrial releases are expected to be heavier early in the first quarter.

Philadelphia—A substantial lessening of plate mill operations is expected in January. Ship and railroad work are the most promising single factors for an upswing later in the month.

Contracts Placed

5700 tons, two tankers for Standard Vacuum Transportation Co., New York, to New York Shipbuilding Co., Camden, N. J. Includes shapes and bars.

1365 tons, tunnel lining, metropolitan water district, Los Angeles, to Youngstown Steel Car Corp., Niles, O.

700 tons, tanks for Adam Scheidt Brewing Co., Norristown, Pa., to McCarter Iron Works, Norristown, Pa.

450 tons, fuel oil tanks, bureau of yards and docks, navy department, Melville, R. I., to Wheeler Engineering Co., New York, $65,895; bids of Dec. 20.

100 tons, two retorts for Longview Fiber Co., Longview, Wash., to Steel Tank & Pipe Co., Portland, Oreg.

Unstated tonnage, elevated water tank, veterans' hospital, Roanoke, Va., to Tippett & Wood, Phillipsburg, N. J., $8526; bids of Dec. 1.

Contracts Pending

450 tons, standpipe, Williamsburg, Va.; federal loan approved.

400 tons, 1,100,000-gallon tank, Beaumont, Tex.; federal loan approved.

400 tons, water tank, Spartansburg, S. C.; applied for federal loan.

250 tons, 750,000-gallon elevated water tank, Barnesville, O.; federal loan approved.

115 tons, 300,000-gallon water tank, East Greenville, Pa.; federal loan approved.

100 tons or more, channel and snag boat 170 x 38 x 7½ feet, United States engineer, Vicksburg, Miss.; bids Jan. 23.

100 tons, two 200-horsepower boilers, Mare Island, Calif.; bids Jan. 18.

Unstated tonnage, 50,000-gallon water tanks for which federal loans have been approved; Gardner, Kan.; Chadwick, Ill.; Whittemore, Ia.; Ogden, Ia.; Cameron, S. C., 75,000-gallon.

Unstated tonnage, 200,000-gallon water tank, Holland, N. Y.; federal loan approved.

Sheets

Sheet Prices, Page 178

Pittsburgh—Sheet buyers did not make unreasonable shipping demands last week and generally speaking, sheet users are not over stocked. Contracting for the first quarter at unchanged prices is better, and some buyers are now placing their commitments with mills, arranging for shipments this month. Black sheets at 2.25c, Pittsburgh; galvanized at 2.85c; and blue annealed, 1.75c, are firm.

Cleveland—Sheet producers here and in a nearby lake district serving the automotive industry do not expect much, if any, reduction in their mill operations this week. Automotive interests are not active in placing contracts for the full quarter, but continue buying moderate tonnages.

Chicago—Sheet mills in the Chicago district still are actively engaged in making shipments on fourth quarter specifications. The holidays have brought a decrease in the volume of new business, but prospects for the first part of the next quarter are bright.

New York—A large potential volume of sheets is required for air-conditioning, an allotment of $1,000,000 having been made for air-conditioning of public buildings at Washington.

Philadelphia — Contracting for sheets is proceeding slowly. Discussion centers in the trade on the possibility of prices for second quarter being announced in January.

Cincinnati — Sheet mills in this district maintained production schedules during the past week. A slackening in demand was attributed solely to inventory and holiday influences.

St. Louis—Moderate improvement is noted in the market for sheets. Inquiries for first quarter have been issued by railroads centering here, and more activity is shown by farm implement makers.

Canadian Iron Output Gains

November production of pig iron in Canada was 29,592 gross tons, compared with 27,002 tons in October and 14,149 tons in November, 1932. The November total was the highest in the dominion since July, 1932. In 11 months, output of pig iron totaled 190,464 gross tons, 39 per cent over the 117,099 tons in the corresponding period of 1932.

Railroads

Track Material Prices, Page 179

Provision for the purchase of more than 100,000 tons of steel rails and the necessary track fastenings, as well as construction and repair of equipment, trackage and bridges, requiring much steel, is made in approval by PWA of loans to six railroads, totaling $27,534,000.

Baltimore & Ohio will buy 50,000 tons of rails and necessary fastenings from its loan of $4,230,000; Southern Pacific will allot 45,000 tons of rails and 13,000 tons of fastenings from the proceeds of its loan of $12,000,000; Wabash from its $1,489,000 will buy 10,000 tons of rails; Kansas, Oklahoma & Gulf will take 5200 tons of rails and the requisite fastenings, its loan being $265,000; Illinois Central will use its $9,300,000 for laying rails, repairing and building of bridges and repair of equipment. About $6,526,000 will be used in repair of freight cars, $1,000,000 for repair of passenger cars and $1,037,000 for rebuilding a viaduct at Big Clifty, Ky., and approaches to Ohio river bridge.

More than 8000 freight cars, 133 locomotives and 30 coaches are involved in new applications for government funds. New York Central will inquire soon for wheels, axles, plates, shapes and bars for first quarter. Nickle Plate is seeking five additional locomotives, making a total of 25.

Much interest by steelmakers in railroad requirements centers on awards of 12,775 freight cars for the Erie, Chesapeake & Ohio and Nickel Plate, set for Jan. 15.

Final approval of a PWA loan of $84,000,000 to the Pennsylvania for electrification of its New York-Washington line and purchase of locomotives and cars has been made.

Additional rail tonnage also is approaching definite placement, as soon as PWA loans and permission from the interstate commerce commission can be arranged. New York, New Haven & Hartford asks permission to borrow from the PWA $1,350,000, to buy 25,000 tons of rails at not over $1,000,000 and 10,000 tons of fastenings at not over $350,000.

Delaware, Lakawanna & Western has specified its 12,000-ton rail order and rolling was started by Pittsburgh mills Dec. 29. This road also has placed 3000 tons of tie plates and some spikes.

Car Orders Placed

Central of Georgia, 200 coal cars, 70-ton capacity, to Pullman Car & Mfg. Corp., Chicago.

Rail Orders Placed

Central of Georgia, 3000 tons, 110-pound rails, to Tennessee Coal, Iron & Railroad Co., Ensley, Ala.

Rail Orders Pending

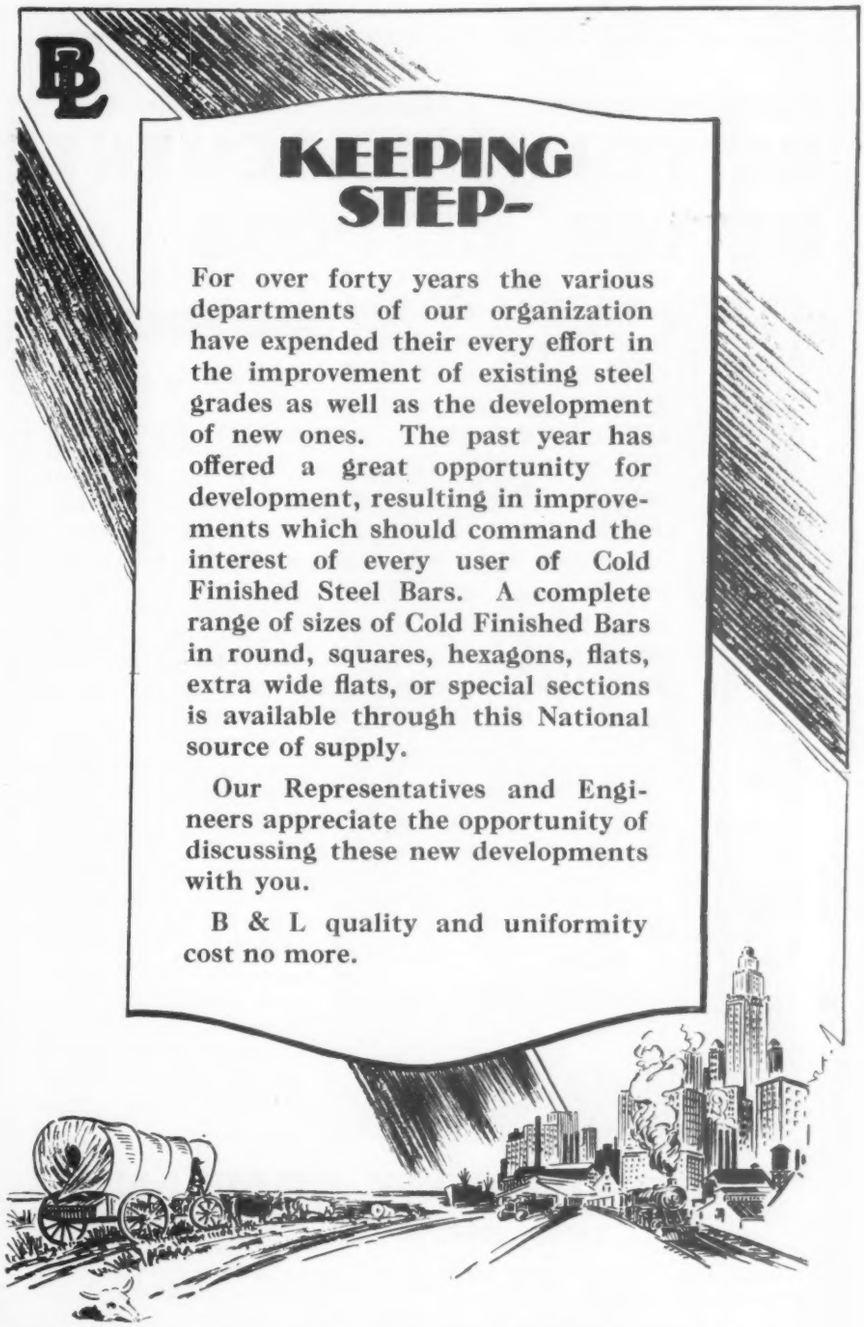
Baltimore & Ohio, 50,000 tons, rails; PWA loan approved.

Kansas, Oklahoma & Gulf, 5200 tons 110-pound rails, fastenings additional; PWA loan approved.

New York, New Haven & Hartford, 25,000 tons rails, 10,000 tons fastenings; loan permission sought.

Southern Pacific, 45,000 tons rails, 13,000 tons fastenings; PWA loan approved.

Wabash, 10,000 tons rails; PWA loan approved.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Shapes

Structural Shape Prices, Page 178

New York — Approximately 20,000 tons of structural steel is active in the New York metropolitan area, three projects accounting for 15,000 tons, including the Manhattan midtown postoffice, Brentwood hospital and Hudson river tunnel shaft. Fabricators are covering at 1.80c, Bethlehem, Pa., for the first quarter.

Cleveland—Little work is pending before fabricating interests here, except several hundred tons for state bridges.

Pittsburgh—Awards and inquiries are largely for public work. Pittsburgh city council has voted to repeal a $6,000,000 bond issue for subway construction that was approved by voters in 1919. This project was to take a large structural tonnage. Two Pennsylvania state highway bridges, 550 tons total, were awarded last week. The base price of structural steel is firm at 1.70c, Pittsburgh.

Chicago—Fabricators, generally, have taken full quotas under fourth quarter contracts but little interest is noted in first quarter commitments. The Bethlehem Steel Co. has been awarded 2500 tons of sheet piling for lock No. 9 at Linxville, Wis.

Boston — Including 12,000 tons for two Cape Cod bridges and more miscellaneous requirements active, structural steel inquiry at the start of the year is the heaviest in a long period. Loans for a large volume of New England work have been approved.

Philadelphia — The structural outlook is improving. In addition to 1000 tons for the Philadelphia approach to the Delaware river bridge speedline, on which bids will be taken Jan. 15, approximately 7000 lineal feet of sheet piling will be required shortly for the Camden approach.

Contracts Placed

2500 tons, sheet piling, lock No. 9, Linxville, Wis., to Bethlehem Steel Co., Bethlehem, Pa.

1310 tons, structural material exclusive of piling, lock 5-A, Winona, Minn., to Milwaukee Bridge Co. Inland Steel Co. awarded 2500 tons of piling, as reported last week.

1000 tons, facilities building, Pearl Harbor, T. H., to Virginia Bridge & Iron Co., Roanoke, Va.

816 tons, Standard Brands of California building, Oakland, Calif., to Herrick Iron Works, Oakland, Calif.

610 tons, tunnel ribs, specification 63, metropolitan water district, Los Angeles, to Youngstown Steel Car Corp., Niles, O.

575 tons, three hangars, bureau of yards and docks, Quantico, Va., to Ingalls Iron Works Co., Birmingham; Girard Construction Co., Philadelphia, general contractor.

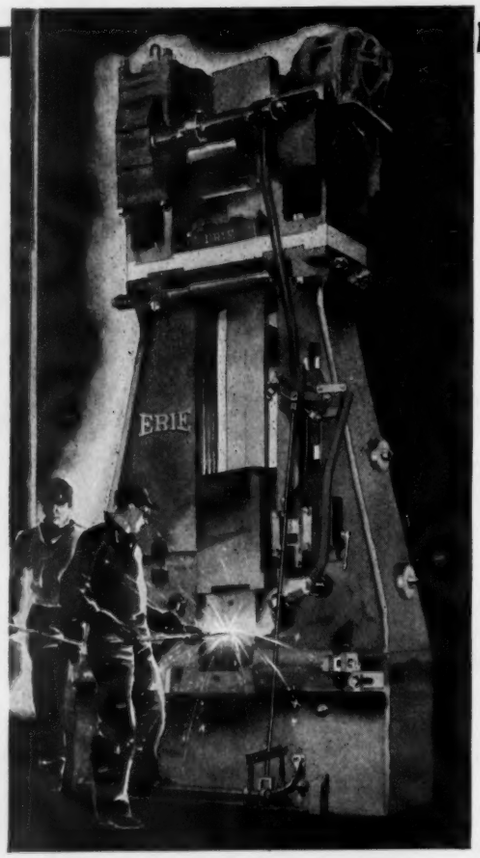
525 tons, columns and beams for tunnel supports, specification 61, metropolitan water district, Los Angeles, to McClintic-Marshall Corp., Los Angeles.

510 tons, bridge, Coffee county, Kansas

Shape Awards Compared

	Tons
Week ended Dec. 30	13,417
Week ended Dec. 23	18,065
Week ended Dec. 16	35,170
This week in 1932	9,783
Weekly average for 1932	17,429
Weekly average for 1933	15,413
Weekly average, Dec.	22,058
Total for 1932	916,130
Total for 1933	801,493

BETTER MANAGEMENT
BETTER METHODS



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to St. Joseph Structural Steel Co., St. Joseph, Mo.

440 tons, classroom building, Howard University, Washington, to Bethlehem Fabricators Inc., Bethlehem, Pa.; Consolidated Engineering Co., Baltimore, general contractor.

435 tons, state highway, Venango borough, Pennsylvania, to McClintic-Marshall Corp., Bethlehem, Pa.

405 tons, two Michigan state highway bridges; 235 tons, bridge at Ypsilanti, Mich., to R. C. Mahon Co., Detroit; 170 tons, bridge at Greenville, Mich., to McClintic-Marshall Corp., Bethlehem, Pa.

400 tons, double hangar, Pope Field, North Carolina, to Dietrich Bros., Baltimore; Southeastern Construction Co., Charlotte, N. C., general contractor. Knoxville Iron Works awarded 60 tons of reinforcing steel bars.

340 tons, extension to pier No. 3, Fort Mason, California; to Judson-Pacific Co., San Francisco.

315 tons, trusses, Franklin county, Indiana, to Midland Structural Steel Co.

257 tons, bridge and approaches, Oconee river, Baldwin county, Georgia, to Virginia Bridge & Iron Co., Roanoke, Va.; Cornell-Young Co., Macon, Ga., general contractor.

255 tons, bridge, Yellowstone river, Montana, to Wisconsin Bridge & Iron Co., North Milwaukee, Wis.

250 tons, magazine buildings, Mare Island, Calif., to Judson-Pacific Co., San Francisco.

239 tons, transit shed, port commission, Houston, Tex., to Houston Structural Steel Co., Houston; American Construction Co., Houston, general contractor.

227 tons, sludge tank, Back river sewage works, Maryland, to Dietrich Bros., Baltimore.

220 tons, lumber storage building, navy yard, Philadelphia, to Belmont Iron Works, Philadelphia; McLennon & McCormick Co., general contractors.

220 tons, bridge and approaches, Cobb-Fulton counties, Georgia, to American Bridge Co., Pittsburgh; George A. Thomason & Co., Greenwood, S. C., general contractor.

210 tons, brewery, Adam Scheidt, Norristown, Pa., to Morris, Wheeler & Co., Philadelphia.

175 tons, miscellaneous buildings, Fort Mifflin, Pennsylvania, to Phoenix Bridge Co., Phoenixville, Pa.

197 tons, sheet piling, pier and quay wall, Pearl Harbor, T. H., to unnamed interest.

165 tons, floor beams and stringers, state bridge, Maryland, to Carolina Steel & Iron Co., Greensboro, N. C.

165 tons, bridge, Prairie du Chien, Wis., to Wausau Bridge & Iron Co.

135 tons, bridge, Wilkerson creek, Bellhaven, N. C., to Virginia Bridge & Iron Co., Roanoke, Va.; through Tidewater Construction Corp.

130 tons, bridge, East Berlin, Vt.; to American Bridge Co., Pittsburgh.

125 tons for dam No. 5, Mississippi river at Minneiska, Minn., divided between Bethlehem Steel Co., Bethlehem, Pa., and Carnegie Steel Co., Pittsburgh.

115 tons, postoffice, Schenectady, N. Y., to Bethlehem Fabricators Inc., Bethlehem, Pa.

110 tons, switch racks, specification 3250, Los Angeles, to McClintic-Marshall Corp., Los Angeles.

106 tons, steel pony truss bridge, Canonsburg borough, Washington county, Pennsylvania, to Lackawanna Steel Construction Corp., Buffalo.

100 tons, Madawaska bridge, Maine, to Lackawanna Steel Construction Corp., Buffalo.

100 tons, state bridge, Washington county, Pennsylvania, to Lackawanna Steel Construction Corp., Buffalo.

Contracts Pending

12,000 tons, superstructure, Manhattan (New York) Midtown postoffice; James Stewart & Co. Inc., low on one alternate; George F. Driscoll Co., Brooklyn, low on second. Alternates differ as to the number of floors. Bids Dec. 27.

1500 tons, substructure, parcel post building, Boston.

1494 tons, and 230 tons of machinery for Park street bridge, Oakland, Calif.; bids Jan. 23.

1200 tons, lock No. 11, Dubuque, Iowa.

1200 tons, substructure, parcel post building, Boston.

1000 tons, first section speedline over Delaware river bridge, Philadelphia, bids Jan. 15; through typographical error this section was reported last week as 15,000 tons.

700 tons, foundation, Library of Con-

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gress, Washington; John McShain, Philadelphia, low for general contract. Project also takes 330 tons of concrete bars.
375 tons, Greylock-Braytonville bridge, North Adams, Mass.; C. B. Lindholm, Jefferson, Mass., low $84,425.80.
315 tons, superstructure pier No. 1, Fort Mason, California; general contract to K. E. Parker, San Francisco.
260 tons, highway bridge, Auburn, Mass.
210 tons, through truss bridge, Lawrence county, Pennsylvania; bids at Harrisburg, Pa., Jan. 5. Included, 25 tons plain steel bars.
200 tons, postoffice addition, Gainesville, Ga.; bids Jan. 9.
135 tons, railroad bridge project, NRH-56, Massachusetts; Arute Bros., Bridgewater, Mass., low, $38,038.50.
278 tons, Eel river bridge, Humboldt county, California; bids Jan. 3.
135 tons, crossing at Beta, Logan county, Colorado; bids Dec. 30.

A. M. Byers Co., Pittsburgh, has taken no action on its quarterly preferred stock dividend due at this time. Previously 50 cents quarterly had been paid on the 7 per cent stock.

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Reinforcing

Reinforcing Bar Prices, Page 179

Pittsburgh—Some reinforcing bar producers expect to have fair rolling schedules early in January to build up depleted mill stocks. Another favorable factor is the volume of bars which contractors for public works will place shortly. The new billet steel reinforcing bar price is firm and unchanged. Buying is on the basis of 1.90c, Pittsburgh, for cut lengths; with 1.80c, Pittsburgh, the mill length base.

Cleveland — State and local public works projects still provide the best market for reinforcing steel, though individual tonnages are small. For New York Central grade elimination work at Syracuse, N. Y., a Cleveland interest has been awarded 500 tons, 500 tons additional going to a New York interest.

Boston—Foundations for the parcel post building, Boston, bids Jan. 2, will take a substantial tonnage. State hospital work accounts for the bulk of inquiry for billet bars.

New York—Approximately 1000 tons for grade crossing eliminations at Syracuse, N. Y., have been equally divided between two distributors, one at Cleveland. Inquiry for highway mesh is smaller following recent heavy purchasing, but a fair volume of billet bars is active.

Philadelphia — Little buying is noted in the market for reinforcing steel here. Demand, however, is accumulating.

Contracts Placed

1000 tons, grade crossing eliminations, New York Central railroad, Syracuse, N. Y., evenly divided between Patterson-Leitch Co., Cleveland, and Concrete Steel Co., New York; Walsh Construction Co., Syracuse, N. Y., general contractor.
600 tons, federal building, San Francisco, to Truscon Steel Co., San Francisco.
315 tons, wall, United States engineer project, Hickman, Ky., to Laclede Steel Co., St. Louis; Foster & Creigh-

Concrete Awards Compared

	Tons
Week ended Dec. 30	3,648
Week ended Dec. 23	2,685
Week ended Dec. 16	12,137
This week in 1932	2,224
Weekly average for 1932	3,920
Weekly average for 1933	3,771
Weekly average, Dec.	5,283
Total to date, 1932	207,768
Total to date, 1933	196,101

ton Co., Nashville, Tenn., general contractor; 1500 tons of steel sheet piling steel pending.
250 tons, magazine buildings, Mare Island, Calif., to Gunn, Carle & Co., San Francisco.
250 tons, mesh, highway, New Hampshire, to American Steel & Wire Co., New York, through Arborio Road Construction Co.
201 tons, transit shed, port commission, Houston, Tex., to Concrete Engineering Co.; American Construction Co., Houston, Tex., general contractor.
200 tons, facilities building, Pearl Harbor, T. H., specification 7074, to Pacific Coast Steel Corp., San Francisco.
200 tons, Hyrum dam, Salt Lake basin project, Ogden, Utah, to unnamed interest.
165 tons, reinforced concrete highway, NRA-210, part 1, Mobile county, Alabama, to Truscon Steel Co., Youngstown, O.; Hancock Co., Mobile, Ala., general contractor.
160 tons, state highway work in Mohave county, Arizona, to unnamed interest.
125 tons, monastery, Jamaica Plain (Boston) to Kalman Steel Corp., Bethlehem, Pa.
107 tons, state highway work in Plumas, Orange, Ventura and Inyo counties, California, to unnamed interests.
100 tons, bridge and approaches, Oconee river, Baldwin county, Georgia, to Kalman Steel Corp., Bethlehem, Pa.; Cornell-Young Co., Macon Georgia, general contractor.
100 tons, Russian river bridge at Monte Rio, Calif., for Santa Rosa county, to Truscon Steel Co., San Francisco.
100 tons, or more, company officers' quarters, Fort Sam Houston, Texas, to Concrete Engineering Co., Chicago; Joseph A. Holpuch & Sons, Chicago, general contractor.

Contracts Pending

2500 tons, substructure, bridge, Fore river, Quincy, Mass.
1000 tons, causeway, Mare Island, Calif.; Barret & Hilp, San Francisco, low.
560 tons, Park street bridge, Oakland, Calif.; bids Jan. 23.
541 tons, lock No. 11, Mississippi river, near Dubuque, Iowa; bids Jan. 11 to United States engineer, Rock Island, Ill. Project also takes 160 tons of steel and iron castings and forgings.
494 tons, lock No. 18, Mississippi river, near Burlington, Iowa; bids Jan 3., to United States engineer, Rock Island, Ill. Project also takes 157 tons of steel castings and forgings.
404 tons, Sunset and Glendale boulevards bridge, Los Angeles; bids Jan. 3.
250 tons, storehouse extension, Pearl Harbor, T. H., specification 7085; bids rejected.
231 tons, state highway work in Los Angeles county, California; Jahn & Bressi, Los Angeles, low.
200 tons, bridges and approaches, Cobb-Fulton county, Georgia; George A. Thomason & Co., Greenwood, S. C., general contractor.
200 tons, Verdugo wash conduit for Los Angeles county, California; bids Jan. 2.
200 tons, mesh, highway, East Hartford-Springfield road, Enfield, Conn.; Daniel O'Connell & Sons Co., Holyoke, Mass., low.
180 tons, 20,000 squares, noncorrosive reinforcing fabric, for federal engineer, New Orleans; bids in Dec. 29.
150 tons, reinforcement for walls of city hall, Long Beach, Calif.; bids Dec. 29.
144 tons, state bridges in Humboldt and Los Angeles counties, California; bids Jan. 3.
132 tons, state highway work in six counties, California; bids Jan. 10.
100 tons, highways and bridges, Connecticut; bids in Dec. 28.

Bar Mill Wages Continue At Advanced Level

Bar iron mill wages in companies having contracts with the Amalgamated Association of Iron, Steel and Tin Workers will remain unchanged for January and February, puddlers to receive $10.80 per ton. The bimonthly settlement by mill and amalgamated representatives last week was based on a 1.50c card, the same as two months ago. However, the arrangement whereby employes actually receive 15 per cent over what their contract would give them, due to the NRA agreement, continues in force.

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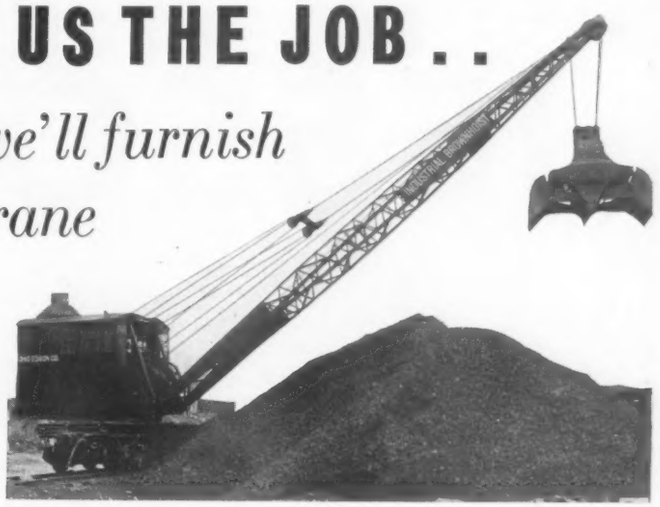

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Pipe

Pipe Prices, Page 179

Pittsburgh—Steel pipe shipments in December exceeded those of November, mainly because of the clean-up specification imposed upon fourth-quarter contracts by the steel code. There is better activity at present in orders for mechanical tubing from the automotive trade but line pipe and oil country goods are showing no life. All pipe discounts are unchanged, the list on standard pipe of July 1 prevailing.

New York—Except for 600 tons of cast pipe for New York city, inquiry is light, largely for small lots. City of Washington is in the market for close to 2000 tons.

Birmingham, Ala.—The new year opens with improved sentiment prevailing in pipe shops, operations in the district having been increased. Several pending contracts of fair size will call for early delivery.

Boston—In New England inquiry is fairly active despite recent heavy purchasing of cast pipe.

Cast Pipe Placed

2915 tons, 6 to 24-inch, class 150, Los Angeles; allocated as follows: 1371 tons, 6, 8 and 16-inch, to National Cast Iron Pipe Co., Birmingham, Ala.; 657 tons, 8 and 16-inch, to R. D. Wood & Co.; 504 tons, 24-inch, to American Cast Iron Pipe Co., Birmingham, Ala.; and 383 tons, 8-inch, to Pacific States Cast Iron Pipe Co., Provo, Utah.

740 tons, 10 and 14-inch, class 150, Santa Cruz, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

700 tons, 6, 8 and 12-inch, Waterbury, Conn., to Donaldson Iron Works, Emaus, Pa.

421 tons, 6 to 12-inch, class 150, Huntington Park, Calif., to American Cast Iron Pipe Co., Birmingham, Ala.

350 tons, Fort Worth, Tex., to American Cast Iron Pipe Co., Birmingham, Ala. City will purchase about 200 tons additional.

194 tons, 20-inch, class 150, Alhambra, Calif., to National Cast Iron Pipe Co., Birmingham, Ala.

150 tons, Rochester, N. H., to Warren Foundry & Pipe Co., Phillipsburg, N. J.

Cast Pipe Pending

2222 tons, 20 and 24-inch, class B, Long Beach, Calif.; bids opened.

600 tons, 8, 12 and 20-inch, New York, also about 100 tons of fittings and miscellaneous castings; bids in.

450 tons, 8-inch and under, Tipton, Mo., also 75,000-gallon tank on 125-foot tower; bids in.

210 tons, 2-inch, Los Angeles; bids Jan. 11.

150 tons, 6 and 8-inch, contracting officer, Fort Monroe, Va.; bids in.

145 tons, 6 and 8-inch, class 150, Napa, Calif.; bids in.

142 tons, 4-inch, class C, Hanford, Calif.; bids opened.

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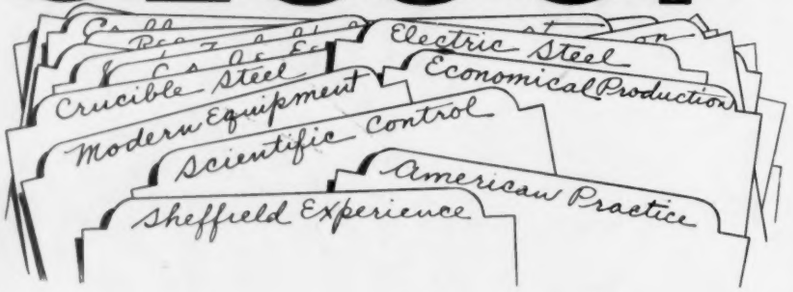

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Strip Steel

Strip Prices, Page 179

Pittsburgh—Most fourth-quarter strip contracts were completely shipped by the end of December but early January is not leaving strip producers entirely without tonnage to roll. The market is fairly active with some buyers closing on first quarter contracts. Report is still current, but unconfirmed, that both hot and cold-rolled strip steel base prices will be advanced soon. For the time being, 1.75c, Pittsburgh, on hot-rolled and 2.40c, Pittsburgh or Cleveland, on cold-rolled strip, are holding.

Cleveland — Orders increased during the week, both in specifica-

tions and new business on which consumers wanted shipment by Dec. 31. Demand, especially from the automotive industry, is increasing.

Philadelphia — Contracting for steel strip is proceeding slowly with conjecture as to second quarter prices an important factor.

Boston—Strip demand continues light. Consumers have not yet liquidated heavy stocks to the point of new buying, although a slight gain in spot ordering is indicated early this quarter. Cold strip is firm at 2.60c, Worcester, Mass.

Tin Plate

Tin Plate Prices, Page 178

Pittsburgh — Tin plate operations eased again last week to an average of 75 per cent, the decline having been caused by the inability of several mills to schedule hot-mill operations for the week. A leading interest, however, maintains a better schedule of current operations than the average, although the downward trend is expected to be shared by all makers before the close of January. All tin plate shipments are now based on the new $5.25 per base box price, with long ternes 3.25c and tin mill black sheets 2.65c, both base Pittsburgh.

New York—While some tin plate consumers are contracting, the larger canmakers will be slower than usual in commiting themselves. Indications point to canmakers being able to contract ahead for periods of six and nine months, due to the existence of long-term arrangements made prior to the code. While canmakers start the new year with substantial inventories, the belief prevails 1934 will be another good year in tin plate.

Semifinished Steel

Semifinished Prices, Page 179

Semifinished steel prices are firm, the only recent change having been in the observance since Jan. 1 of a $36, Pittsburgh, base on wire rods on all shipments. Shipments of sheet bars at Pittsburgh declined during the week.

Cold Finished

Cold Finished Prices, Page 179

Pittsburgh — The following advanced base prices are now quoted both on cold-finished steel bar orders and shipments: Pittsburgh, 2.10c; Chicago and Cleveland, 2.15c; Buffalo, 2.00c; Detroit, 2.30c; and eastern Michigan, 2.35c.

Turned and ground shafting has also been advanced to the following bases: Pittsburgh, 1⅛-inch, 3.40c; 1 3/16 to 1½-inch, 2.90c; 1 9/16 to 1⅞-inch, 2.75c; 1 15/16 to 2⅞-inch, 2.60c; and 2 15/16 to 6-inch, 2.45c.

Advances in both products are effective with Jan. 1.

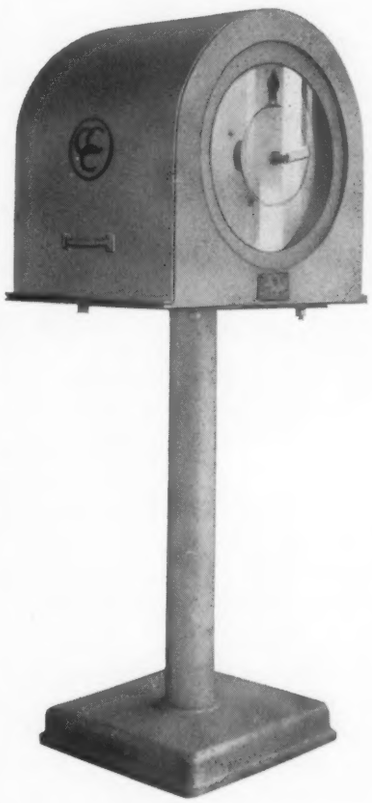
Wire

Wire Prices, Page 179

Pittsburgh — Advanced prices on wire products are having full effect because first quarter contracts, and in fact all shipments of wire products since Jan. 1 are billed at the advanced schedule, $2.35 per keg on nails, 2.20c on plain wire to the

CLARK

AUTOMATIC SHEET MEASURING DEVICE



For use in any sheet or tin mill using automatic roller and catching tables and can be applied to existing installations without modification of such installations.

After the sheet passes through rolls it automatically gives an accurate indication of length of sheet by movement of pointer on an illuminated dial which may be calibrated to read directly in inches. Position of pointer is maintained while the sheet is taken back over top of rolls and until it starts through the next pass giving operator ample time to note definitely the length and set his rolls accordingly.

During next pass pointer moves from previous position to new position again indicating length of sheet after the latest pass. This operation is repeated until required length of sheet is obtained. The next piece as delivered from furnace automatically resets the pointer to indicate lengths, making it possible for the operator to know definitely the length of the sheet after each pass.

THE CLARK CONTROLLER CO.
1146 East 152nd St.
Cleveland, Ohio

manufacturing trade, and 2.35c for annealed fence wire.

Cleveland—Interest in the market during the week was centered on shipments, contracting for first quarter so far being light. Many consumers have indicated their intention to buy as requirements arise, rather than contract, feeling secure with the 10-day notice on any price advances which might be made. In some instances recent orders have been held up owing to the inability of buyers to finance purchases.

Chicago—Wire shipments are unseasonally heavy, with some mills engaged to capacity. Sellers are convinced that most current shipments are for immediate needs, with little going into inventories.

Boston — Wire mills ended the last week of the year operating at a high rate in some drawing departments, but a recession is probable early in the year following shipment of fourth quarter specifications.

American Steel & Wire Co., Worcester, Mass., has booked 276,291 feet of wire rope railing for the state of Connecticut, through Webster & Webster, East Hartford, Conn.

New York—Specifications for wire in December were the heaviest in the experience of some suppliers. Mill stocks of wire, perhaps to a greater degree than other products, will require much tonnage to replenish them after the first of the year.

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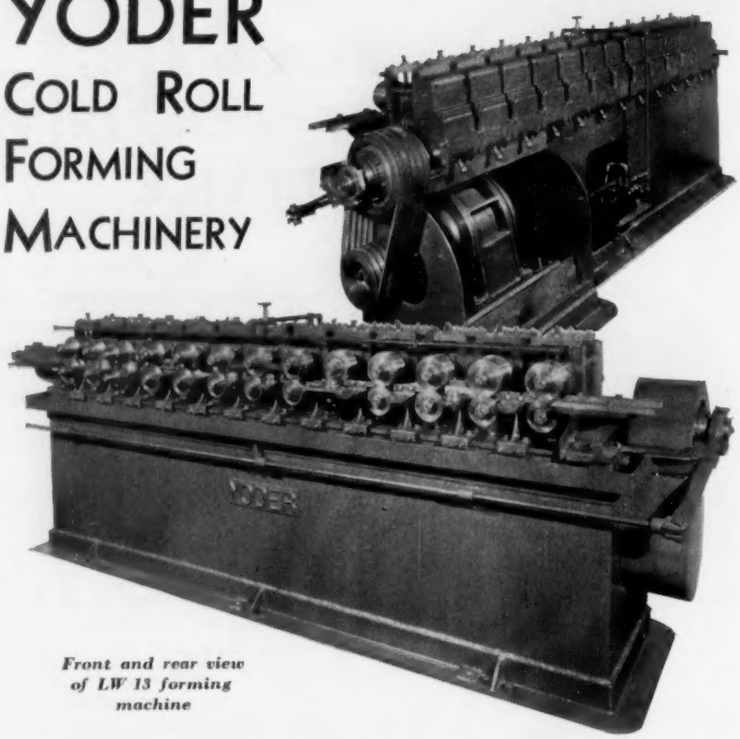
FORMING
MACHINERY



Front and rear view of LW 13 forming machine

This machine is used for forming miscellaneous shapes from light gauge metal. Yoder Cold Roll Forming Machines are equipped with anti-friction bearings and worm gear drive completely encased and running in oil.

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W. 55 ST. and WALWORTH AVE. CLEVELAND, OHIO
PLATE AND SHEET METAL MACHINERY SPECIALISTS

Warehouse

Warehouse Prices, Page 182

Pittsburgh—Steel warehouse sales show a downward trend but December closed with volume about equal to November and considerably ahead of December, 1932. As the new quarter opens the only revision expected is in cold-drawn bars out of stock.

Cleveland — Cold-finished steel from warehouse here is up $3 a ton to 3.40c, in conformity with the advance in mill price. Holiday influences were more noticeable in the market during the week.

Philadelphia—The advance of $3 a ton on cold-finished bars to 3.73c, effective Jan. 1 is the feature of the market. December volume was below that of November.

Cincinnati—December warehouse trade was satisfactory, though below that of November. Seasonal decline was less than expected.

St. Louis—Typical holiday conditions obtain in the iron and steel warehouse trade. Volume has tapered and no betterment is looked for until after inventory. December volume was up to expectations, and considerably heavier than a year ago.

Bolts and Nuts

Bolt, Nut, Rivet Prices, Page 179

Contracting for first quarter is proceeding slowly in bolts, nuts and rivets at Pittsburgh. The bolt and nut discount is 70 off and the rivet base is 2.75c on large rivets and 70 and 10 off for small rivets.

Wrought washers have been extended until at least Jan. 15 at 6.00 to 6.25 off list, all basing points. An advance in wrought washers the latter half of January is being considered.

Shipments of nuts and bolts to the automotive industry continued strong throughout the week, but other lines were quiet at Cleveland.

Pig Iron

Pig Iron Prices, Page 180

Pittsburgh — The pig iron market enters the new year inauspiciously. Foundries, with few orders on hand, are unwilling to make commitments and larger users, such as the nonintegrated steel producers, are showing every indication of being out of the market for some time. The $18, Neville Island, base on foundry iron continues, as does a nominal level of $17.50 on basic and $18.50 on bessemer.

Cleveland — Eighty per cent of the tonnage on fourth quarter contracts for a leading merchant furnace interest was specified for shipment by Jan. 1. Shipments on these contracts in December finally worked out to 75 per cent above the November shipments. Stocks are much lower than a year ago, and no change in blast furnace operations is in view. Forward buying, however, is light, sales here for the week approximating 3000 tons. Prices are steady.

Boston—Since most smaller foundries took in shipments under old contracts and at present are well stocked, new business at advanced prices is slack. Large users of pig iron are slow to cover for future requirements.

Philadelphia — Unusually heavy shipments of pig iron continued throughout the final week of December and sellers now expect little new buying until well into this quarter.

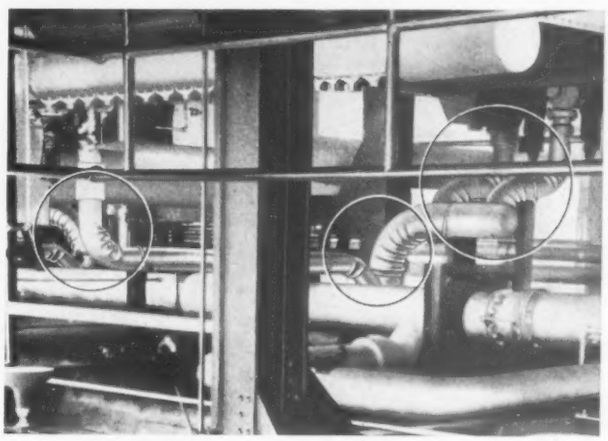
Cincinnati—The closing week of the year resulted in heavy shipments against old contracts, with only unimportant tonnage canceled. New contracting for the first quarter is in a lull so that principal business during the past week was in spot shipments. Foundry melt is fairly steady while the usual contracting for alloys is under way.

St. Louis—Tonnages shipped during the last week of December will raise the total for the month to the highest for that month in four years. St. Louis Gas & Coke Corp., through Hickman-Williams & Co., its selling agency, announces that not more than 5 per cent of its outstanding low-priced contracts were canceled Jan. 1.

Birmingham, Ala.—Production of pig iron in Alabama for the year shows considerable increase over 1932. Deliveries eased off during the week but as resumption of operations comes in the first week of January prompt delivery is assured.

Toronto, Ont.—Mid-holiday season brought about a general slowing in demand for merchant iron in Canadian markets. Melters are withholding orders until the turn of the year, and sales are at a minimum. Prices are unchanged.

Buffalo—December shipments of pig iron have exceeded those of any year since 1930, Buffalo producers report. How seriously the movement will cut into January deliveries remains to be seen, but there is a general belief that first quarter business will continue of substantial proportions, with malleable selling especially well. All five furnaces now in production here are scheduled to continue in operation through the first quarter. The fact that there is no guarantee against a quick advance in iron prices is causing some consumers to plan coverage shortly after Jan. 1 for the entire quarter, in the opinion of sellers.



Creflex Welding Fittings eliminated 12 Line Welds

The use of Creflex Welding Fittings with long tangents in the safety valve exhaust lines shown above, not only eliminated a dozen line welds, but also reduced the number of welded joints to a minimum.

The longer tangents of these fittings removed all necessary welds far from zones of high stress, and provided a higher factor of safety in the welds.

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Scrap

Scrap Prices, Page 181

Pittsburgh — Without widespread test of consumer buying the iron and steel scrap market has been strong because holders anticipate higher prices and distress tonnages are absent. No. 2 steel was especially strong at Pittsburgh last week with $11.50 paid by a down-river mill. Rails are reported to have been sold for over $13. A sale of 15,000 tons of heavy breakable cast in this district was at $11.50. Some test of railroad specialties will develop with the closing early this month on Pennsylvania, Baltimore & Ohio and other representative rail lists. Scrap prices are 75 to 100 per cent higher than a year ago.

Cleveland—Holiday quiet characterizes the iron and steel scrap trade. Buying has faded out to small lots for definite use. Shipments continue in fair volume on orders, largely for heavy steel, pressed sheets, mixed borings and No. 2 busheling.

New York Central closes Jan. 3 at Cleveland on 1650 tons of scrap rails and 46 carloads of No. 1 heavy melting steel, its December list.

Chicago—Although demand for scrap from melters continues quiet, trading between dealers is active. Supplies are scarce. The market has a strong undertone with advances of 50c to $1. With no improvement in supplies expected until spring railroad offerings come into the market, and with higher steelmaking rates expected shortly after the turn of the year, predictions are being freely made of materially stronger prices by the end of first quarter.

Boston—Steel and iron scrap is more active and prices are firm. Dealers' prices on heavy melting steel and scrap rails have been advanced 25 cents and shafting 50 cents.

New York—Firm prices prevail for scrap. Heavy melting steel continues $8 and $7, barge, with dealers buying actively for export. Shipments to eastern mills and foundries are slightly heavier. Harrisburg, Pa., is paying $10.50 for breakable cast and $8.50 for stove plate. Shipments of the latter are being made from Northern New Jersey by rail.

Philadelphia—Trend of steel and iron scrap is strong, though there is little new business. Dealers now are paying $10.75 against $11 orders for heavy breakable cast, with indications of higher consumer prices shortly.

Buffalo—Principal consumers have given orders to resume shipments on contracts Jan. 2. A melter is reported offering $8 for No. 2 heavy melting steel and $9.50 for No. 1. So far dealers have refused to sell. Cast and malleable are stronger and sales of these and other materials, notably borings and turnings, continue at or near the top of quoted ranges.

Cincinnati—The iron and steel scrap market continues strong, with little distress material. Strength in prices is chiefly a reflection of advances elsewhere, as mills are still taking material on contracts.

Birmingham, Ala.—The market for steel and iron scrap is considerably firmer as preparations are under way for active operations at pipe shops and foundries. Prices are unchanged and heavy melting steel is steady.

St. Louis—Recent purchases of steel scrap by mills have been reflected in general scarcity and sharp-

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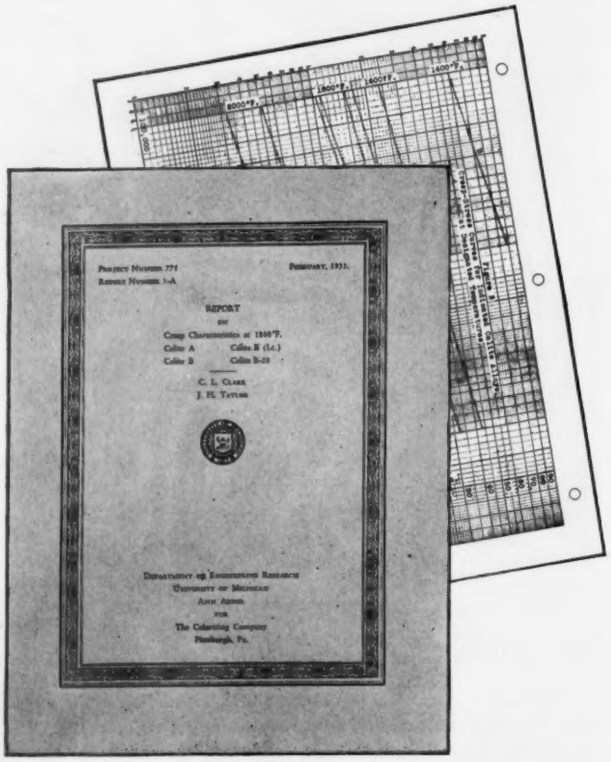

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ly higher prices for a number of grades. A further factor has been light offerings from all sources.

Dealers who sold the market short are being hard put to obtain tonnages to apply on their contracts. This is true particularly of heavy melting steel and steel specialties.

Detroit—An advancing tendency marks steel and iron scrap and quotations have been marked up 25 to 50 cents per ton on a number of grades. Scrap output is slow as automotive production gets under way.

Toronto, Ont.—Trading in iron and steel scrap is dull. Steel scrap is at a standstill and most iron grades are quiet. Odd sales of cast scrap are being made. Dealers are out of the market but look for revival with the new year. Prices are steady but unchanged.

Coke

Coke Prices, Page 179

Beehive coke is being quoted unchanged into January at least, according to the following base prices on a Connellsville oven basis: Furnace coke, $3.75 per ton; medium sulphur furnace coke, $3.25 per ton; and common foundry coke, $4.25 per ton. Premium foundry coke, however, is now being quoted at a minimum of $5 per ton, instead of $5.25 as previously.

The coke market at Pittsburgh is made up of small orders.

Shipments of by-product foundry coke at Cincinnati have been steady and prices are steady.

In the Birmingham area the market is strong and shipments are holding in good volume.

Better contracting for first quarter is being done by coke consumers at St. Louis and heavier than seasonal movement is in effect.

Ferroalloys

Ferroalloy Prices, Page 180

While protecting themselves in long term commitments against variations in the dollar, some ferroalloy sellers assure customers that the prices recently announced will definitely apply until March 31 and thereafter for each calendar quarter this year, unless revised in writing by the seller at least 15 days prior to such quarter.

If a revision is not acceptable to the buyer he may cancel tonnage by written notice ten days prior to such quarter. Protection also is provided the seller against excise and other special taxes.

Contracting for ferroalloys at Pittsburgh was brisk during the week.

Metals

Nonferrous Metal Prices, Page 179, 180

New York — Nonferrous metals generally reflected the usual year-end quietness during the past week. Demand was at a minimum with the trend in prices slightly downward.

Copper—Customs smelters openly quoted 8.25c, Connecticut, but demand was of such insignificant proportions that it was uncertain what reception shaded bids would be given.

Lead — Buying was quiet but prices maintained a steady appearance. Battery makers have been heaviest buyers recently.

Tin—Straits metal slid well below the 53-cent level as the dollar tended to gain strength in terms of sterling. Leading tin producing countries were permitted to increase export quotas to roughly 44 per cent of the 1929 production beginning Jan. 1 compared with 33 1/3 per cent previously.

Zinc—Further weakness developed with the going market settling $2 a ton lower to 4.35c, East St. Louis. This followed a $1 a ton cut Dec. 20. Sales continued light.

Antimony—The market firmed up slightly but business still was negligible.

Iron Ore

Iron Ore Prices, Page 180

Cleveland—Of the 21,407,809 tons of iron ore shipped by vessels in 1933 from the Lake Superior district nonbessemer grades constituted 14,732,397 tons, according to the Lake Superior Iron Ore association. Bessemer grades amounted to 5,657,467 tons; manganiferous, 675,167 tons; silicon, 332,842 tons; and aluminiferous, 9936 tons.

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Scrap Iron and Steel

Pacific Coast

Pacific Coast Prices, Page 179, 180, 182

San Francisco—(*By Air Mail*)—Despite the holiday and approach of inventory, demand has been well sustained and awards of structural shapes, plates and cast iron pipe were heavier than in over a month. The state of California voted bonds Dec. 19 for $170,000,000 for the Central valley water project. Over 11,000 tons of steel will be required.

No definite action has been taken by the Southern Pacific and Western Pacific on rail and track fastenings, over 45,000 tons of the former and 13,000 tons of the latter.

Reinforcing bar awards aggregated 2693 tons. Truscon Steel Co. secured 600 tons for the federal building, San Francisco, and 100 tons for a bridge over the Russian river in California. Gunn, Carle & Co. took 250 tons for magazine buildings at Mare Island, Calif., and Pacific Coast Steel Corp., booked 200 tons for the facilities building at Pearl Harbor, T. H. Bids open Jan. 3 on 404 tons for a bridge in Los Angeles. Bids open Jan. 23 on 560 tons for the Park street bridge in Oakland, Calif.

Youngstown Steel Car Corp., Niles, O., secured 1365 tons of plates and 610 tons of shapes for tunnel lining for the metropolitan water district, Los Angeles, and McClintic-Marshall Corp., Bethlehem, Pa., was awarded 525 tons of shapes for the same project. Bids open Jan. 18 for 100 tons for two 200-horsepower boilers for Mare Island, Calif.

Structural awards were the third largest of any week of the year and totaled 8395 tons. Herrick Iron Works secured 816 tons for the Standard Brands of California building in Oakland, Calif., and Virginia Bridge & Iron Co., Los Angeles, took 1000 tons for the facilities building at Pearl Harbor, T. H. Judson-Pacific Co. booked 340 tons and 250 tons, respectively, for Pier No. 3, San Francisco, and for magazine buildings at Mare Island, Calif. Bids open Jan. 23 for 1494 tons for the Park street bridge, Oakland, Calif.

Over 1400 tons of cast iron pipe awards were reported. United States Pipe & Foundry Co. took 740 tons for Santa Cruz, Calif., American Cast Iron Pipe Co. booked 421 tons for Huntington Park, Calif., and National Cast Iron Pipe Co. took 194 tons for Alhambra, Calif. Napa, Calif., opened bids Dec. 26 for 145 tons of 6 and 8-inch pipe and Los Angeles will take bids Jan. 11 for over 200 tons of 2-inch pipe.

Northwest Market Quiet

Seattle—There is little activity in the iron and steel markets of the Pacific Northwest. While many projects are close at hand no awards of importance were announced this week. Wholesale jobbers are marking time until after the holidays. All markets are firm and prices have been well stabilized.

Local interest this week attaches to opening of bids for the third time for the Seattle seawall and waterfront improvement, involving about 7500 tons of steel. Only one bid was tendered, that of the General Construction Co., Seattle, at $1,516,131, this being $150,000 more than funds available. No action has been taken, city officials again considering day labor. Steel Tank & Pipe Co., Portland, Oreg., was awarded 100 tons of plates for two retorts

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Highway work in Pacific Northwest states continues at a fast pace. This week Washington awarded 18 projects totaling $1,000,000 but involving no tonnages of steel. On Jan. 3, Washington will receive tenders for five grading projects and on Jan. 9 bids for 12 jobs including a 2301-foot steel and timber viaduct at Seattle and a 123-foot reinforced concrete span in Lewis county. State engineers are preparing plans for the proposed Deception Pass bridge, between Skagit and Island counties, Wash., estimated to cost $325,000. Specifications will not limit fabrication to local plants, in order to take advantage of a loan from the government.

Lake Union Dry Dock & Machine Works, Seattle, is expanding its docks and other facilities preparatory to construction of three steel coast guard cutters. Pacific Coast Steel Corp., Seattle, is low bidder at $10,552 for furnishing rails, frogs and other equipment for the Mare Island navy yard.

Bureau of roads opened bids at Portland for four highway jobs in Oregon and Washington, exceeding $200,000.

Cast iron pipe inquiry is at low ebb at present but specifications for much work are expected in the near future, as municipalities get financial assistance from governmental sources. The scrap market is rather quiet but firm and new activity is anticipated within 30 days. Steel rails and No. 1 melting scrap are in best demand and buyers show much interest in old steel steamers for breaking up.

Steel in Europe

Foreign Steel Prices, Page 182

London—(*By Cable*)—British markets are affected less by the usual holiday influence this year, substantial contracts are being booked and further inquiries are circulating. Prospects for the new year are brighter than in several years. Railroads and automotive builders are the largest prospective users of steel. Shipbuilding still lags behind other users but improves.

Reports from the Continent are better, with improved undertone. Exports from Germany show an increase in December. Far Eastern markets are more active. Finland has placed 12,000 tons of rails with the International Rail Manufacturers association and allocation has been made to British, French and Belgian mills.

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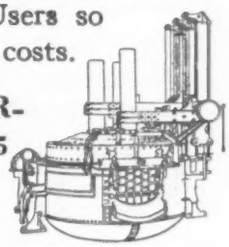

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Operations

HOLIDAY interruptions lowered the national steelmaking average 2 points to 36 per cent for the week ended Dec. 30. Normally, the decline between Christmas and New Year is pronounced; a year ago the rate was only 13 per cent. For the first week of January chances favor a further easing in production, due to the Dec. 31 deadline imposed on fourth quarter shipments.

Chicago mills, on reopening after the Christmas holidays, regained the 40 per cent average of the preceding week, and while the average for the week was pulled down to about 35 per cent, the rate of operations at the close of the week was 40 per cent. All makers operated the same number of units after the holidays.

At Pittsburgh, open-hearth schedules averaged 27 per cent last week, a decline of 2 points due mainly to effects of open-hearth shutdowns Dec. 23 to 26, and also from Dec. 30 to Jan. 1. On the intermediate days, open-hearth operations at Pittsburgh averaged a trifle above 30 per cent. In the Pittsburgh district, including Johnstown, 15 out of a possible 60 blast furnaces still were in blast.

Wheeling, W. Va., district open-hearth schedules averaged 41 per cent last week, a decline of 10 points. There were 16 of 39 open-hearth furnaces active through the week, a decline of three among four district plants.

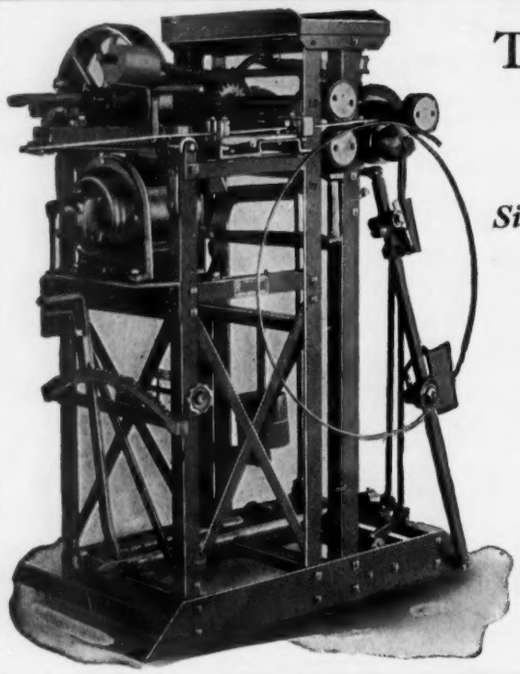
Central eastern seaboard operations last week were down 1½ points to 24½ per cent and are expected to drop several points this week. No perceptible improvement is likely until after inventory-taking, although ship and railroad tonnage may have an early stimulating effect. Mills defaulted on a relatively small percentage of business accepted for late December delivery. Severe weather conditions have complicated deliveries.

Youngstown operations sagged only one point last week, due to the holidays, going to 38 per cent for the week with 31 out of 83 open hearths melting. This week the rate may be down 4 points to 34 per cent.

Steelworks operations in the Cleveland-Lorain district for the week ended Dec. 30 averaged 45 per cent, down 12 points from the preceding week. This reduction was due largely to holiday interruptions, as National Tube Co., Lorain, resumed with ten open hearths Dec. 26, and again suspended Dec. 30 for the New Year holidays. It will resume with ten, Jan. 2. Otis Steel Co. operated five, and may light an additional hearth this week. Corrigan, McKinney Steel Co. operated seven during the week.

Production of ingots in the Buffalo district continued at a brisk rate during the holiday week, with 14 open hearths in operation, representing 37 per cent of capacity. It is believed that the spurt to get out tonnage before the end of the year may cut into early January production but at present it is expected operations in the new year will begin near the level of late December. December average of production was more than 100 per cent greater than 1932 and about 20 per cent over 1931.

At Birmingham, Ala., steelworks snapped back to 52 per cent at the close of last week after the three-day



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holiday. Indications point to a slight increase shortly.

New England steelworks survived holiday interruptions with no appreciable diminution of the 72 per cent rate, and this week the addition of two open hearths will lift the rate.

Equipment

Cleveland—Buyers of machine tools and equipment are inclined to defer purchases until later in the month, although a fair volume is being closed from day to day, mostly small orders. Some comment is being heard of large purchases of machinery by Citroen, manufacturer of small cars in France. While favorable exchange rates resulting from the depreciated dollar have helped to stimulate purchasing of American equipment by foreign builders, Citroen for a number of years has followed production methods in this country closely and installed many American tools in his plants. Recently Citroen has started work on a new truck model and made changes in present lines which will require toolroom and production machinery. A small amount of this equipment has been placed, three builders here supplying some of the machines; more will follow as the Citroen program makes further progress.

New York—The year-end lull has affected machinery orders adversely, although a fair volume remains for action early this year when some long pending equipment purchases likely will be made after budget appropriations. Meanwhile, new bids are in for a New York city fire department machine shop, involving about 15 tools, and on a small list of machinery for a school shop at Haverstraw, N. Y.

Boston—Orton Crane & Shovel Co., Chicago, has booked a locomotive and gantry crane for the navy yard here. Bids close Jan. 3 on 12 motor-driven lathes for the Newport, R. I., naval station.

Financial

A MINIMUM bid of $45,000 will be acceptable for the Belfont Steel & Wire Co., Ironton, O., under a reappraisement preliminary to public sale, at court order, Jan. 18. The company has been in receivership four years.

¶A. M. Byers Co., Pittsburgh, and subsidiaries reports net loss of $167,562 for the third quarter of 1933, comparing with net loss of $265,237 in the preceding quarter.

¶Dominion Steel & Coal Corp. stockholders have approved a plan postponing interest payments due from March 1, 1933, up to and including Sept. 1, 1935. Payments on account of interest in arrears will be made on May 31 and Nov. 30, 1934, and in each year thereafter on condition such payment does not reduce working capital below $3,000,000.

¶American Car & Foundry Co. reports net loss of $1,538,772 in the six months ended Oct. 31, against loss of $985,365 in the corresponding period a year ago.

¶Midland Steel Products Co., Cleveland, had net profit of $692,630, after charges, in the first 10 months of 1933. A year ago the loss was $492,631.

¶National Steel Corp. has changed its directors meeting to the tenth of the month following the close of each calendar quarter, in order to consider the results of the preceding quarter.

¶F. E. Meyers & Bro. Co., Ashland, O., reports for the fiscal year ended Oct. 31 after all charges, net profit of $242,777, equal to 91 cents per share on the common after the preferred dividend. In the preceding year the net was $197,116, or 54 cents per share.

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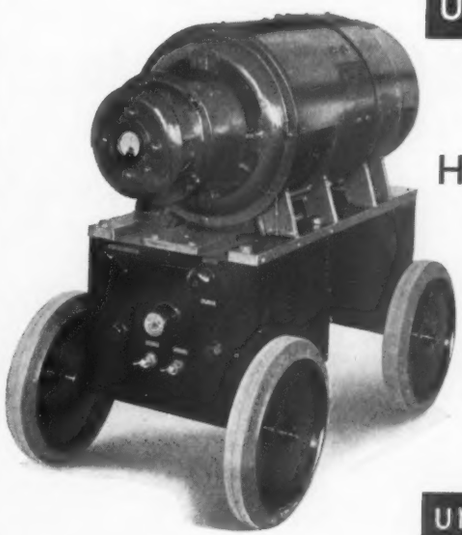

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UNIVERSAL WELDERS
Clarkstone Road Cleveland, Ohio

November Sheet Sales Up; Output, Shipments Lower

Sales of steel sheets for November averaged 2945 net tons daily, according to the National Association of Flat Rolled Steel Manufacturers, Pittsburgh. The October average was 2553 tons. Production, however, dropped from 4713 daily average in October to 3419 in November; and shipments declined from 5639 tons to 3319.

November sales totaled 88,354 tons; production, 102,585 tons; and shipments, 99,499 tons. Unfilled tonnage as of Dec. 1 was 94,270 tons. Total sheet capacity in the United States for November was approximately 500,000 tons; and the capacity on which the association's figures are based was 325,000 tons.

Thompson Wins Tax Refund

Steel Products Co., now the Thompson Products Inc., Cleveland, has been granted refunds by the commissioner of internal revenue amounting to nearly $40,000 for overassessments of income and profits taxes for 1917-20.

NONSHRINK OIL HARDENING

TOOL STEEL TUBING

Manufacturers of BISCO Tungsten Carbide and Tantalum Carbide drawing dies for wire, rod and tubing.

A saving will be realized by using our Tool Steel Tubing. Carried in stock up to 12″ O.D. x 2″ wall thickness. It is excellent for all classes of dies, slitters, spacers, bushings, etc.

We also supply a special tubing conforming in analysis to S.A.E. 52100 and S.A.E. 4615 designed particularly for Ball Bearing purposes. Can be furnished in Hot Rolled or Cold Drawn finish.

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Canada Starts To Come Back in 1933

INDUSTRIAL depression in Canada reached rock bottom in 1932, and the latter half of 1933 showed definite indications of improvement. In the iron and steel industry there was a pronounced slump in operations from late in February until the latter part of June, when a sharp upswing in operations developed.

During the first half of the year steel mills maintained an operating rate of 10 to 15 per cent. The placing of large rail contracts by the Canadian National Railways in July brought a more optimistic turn to the industry, and officials of the Dominion Steel & Coal Co., Sidney, N. S., issued a statement to the effect that the company had sufficient orders assured to keep the plant operating at approximately 50 per cent capacity until the end of the year.

Similar conditions prevailed at the plant of Algoma Steel Corp., Sault Ste. Marie, Ont. The Steel Co. of Canada Ltd., Hamilton, Ont., with its diversified range of products, was more fortunate and succeeded in maintaining production between 25 and 35 per cent during the year.

Mines Buy New Equipment

Increased mining activity in all sections of the dominion was largely responsible for direct improvement in some branches of the iron and steel industry. From this source came numerous and large orders for steel, mining plant machinery and milling equipment.

The automotive industry also played a leading part in the industrial upswing. Production and sales of motor cars and trucks reached the highest level in two or three years and producers maintained a good demand for raw materials, a large part of which was purchased in this country.

Building trades were practically at a standstill throughout the year, with only a few large tonnage projects reported during the period. Structural steel fabricators had only small jobs to furnish an outlet for their product with the result that operations were at a minimum rate. The slump in building trades was in turn reflected in practical suspension of operations in radiator and sanitary ware manufacturing plants, while producers of builders' hardware had little call for their product. Toward the close of the year, however, there was some revival in construction work, mostly in small factories and dwellings which gave a

much brighter outlook to the trade.

The general trend of business during the year is indicated by the output of pig iron. The year opened with two blast furnaces blowing and January iron output amounted to 29,204 long tons. In February, one stack was in with production of 6114 tons. From the end of February to the end of May, Canada had no blast furnaces blowing and consequently no production of iron.

Late in June one furnace blew in and that month gave a production figure of 687 tons; in July three furnaces were blowing and output for that month totalled 31,689 tons, with this rate practically sustained to the end of the year.

Pig iron prices held unchanged until the middle of the year, when producers dropped the price on all grades $1.50 per ton and the year closed with iron quoted at No. 1 (2.25 to 2.75 silicon) $21; malleable, $21; No. 2 (1.75 to 2.25 silicon) $20.50, Toronto.

The Montreal price followed similar range with the close No. 1, $22.50; malleable, $22.50; No. 2 $22; and basic, $22.

Canadian Production of Iron and Steel

Gross Tons

	Pig iron	Steel ingots	Steel castings	Ferro-alloys
1923	880,018	839,710	45,060	29,961
1924	593,024	625,175	25,515	26,400
1925	570,397	733,855	18,840	25,709
1926	737,503	745,550	33,338	57,416
1927	707,697	867,928	39,710	56,230
1928	1,037,727	1,190,001	44,718	44,882
1929	1,090,244	1,309,543	70,145	80,010
1930	747,178	957,430	54,313	65,223
1931	420,038	664,826	37,055	46,764
1932	144,130	312,360	22,915	15,487
(a) 1933	212,667	391,994	15,535	23,740

(a)—December production figures estimated.

These Leaders Say Concerning 1934:

ERNEST T. WEIR, chairman, National Steel Corp., Pittsburgh: "What the future will afford is dependent on many factors. Rail purchases and increased automotive activity promise well for higher production levels in the early part of 1934, but a long time look ahead is practically impossible at this time. These two industries consume approximately one-third of all steel production.

"With any new activities in private construction added to the public works program it is safe to predict that all the major steel companies may be expected to show marked improvement in operations. Newly established efficiencies and economies arrived at during the depression will be reflected for the first time at the expected higher production levels of this year.

"Higher prices for all steel products are a foregone conclusion as a result of the greatly increased costs of production under code compliance. The payroll increase for the entire steel industry is over $100,000,000 annually.

"Concrete results of the 'new deal' are too indefinite for anyone to intelligently arrive at sound conclusions regarding the partnership between government and industry. Likewise the 'ups and downs' of 1933 have to some extent been influenced largely by experimental plans. It has yet to be proved that prosperity can be arrived at via legislation."

P. D. Block, president, Inland Steel Co., Chicago, said:

"No event was of greater importance to our industry in 1933 than the adoption on Aug. 17 of the iron and steel code of fair competition. Many of the complex questions involved in the operation of the code have been settled, others are still to be worked out; but already it seems clear to us that the code should bring very definite benefits, not only to the companies involved and their employes, but also to the buyers of iron and steel products.

"In short, the code will give all of us what its name implies—'fair competition'—and with that the degree of stability which we all need for the return to safer, better business conditions.

"Inland can again report a broadening of its ability to serve by additions to its line of products. Our new department for the production of coke and charcoal tin plate and tin mill black sheets is in operation, and

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also
STAINLESS METALS
in
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Chicago, Ill.

H. L. Brown,
2001 Carew Tower
Cincinnati, Ohio

we are very pleased with the fine quality of these new Inland products."

Gerard Swope, president, General Electric Co., Schenectady, N. Y.:

"The problem of today is to have a greater revival in the capital goods industry, which has felt the increase but little, and with all the experiments that are being made and the hopeful and constructive attitude being shown, we are looking forward with confidence that 1934 will be a better year than 1933 in employment and in industry."

O. C. Huffman, president, Continental Can Co. Inc., New York:

"Present prospects for the can-making industry in 1934 are bright. There is a likelihood that plantings will be increased and canning activity stimulated. Stocks of six of the seven principal can commodities in the hands of representative canners on Oct. 1 were 13 to 64 per cent lower than the year previous.

"In addition prospects are that the use of nonrefillable tin cans for packaging motor oil will expand. The demand for general line containers should show improvement during the coming year."

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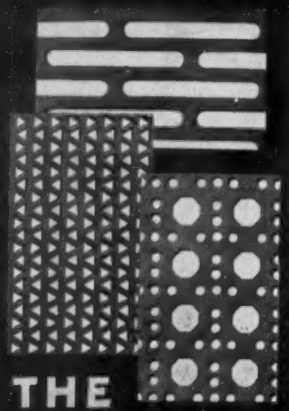

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Address your request to Department S-58

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Codes

¶The hearing on the chilled car wheel industry code Dec. 20 was a rarity under NRA; not one objection was raised. E. P. Waud, representing the Association of Manufacturers of Chilled Car Wheels, said 90 per cent of all rail-borne commerce was moved on wheels produced by companies which he represented. The 40-hour maximum week will increase employment 18 to 42 per cent, and the 30-cent hourly minimum will raise annual payrolls 12½ per cent, according to Mr. Waud.

¶President Roosevelt Dec. 15 approved 10 codes, bringing the total number up to 160. Included are the oxyacetylene industry effective Dec. 18, the valve and fittings industry effective Dec. 21, and the metal tank industry effective Dec. 25.

The nonferrous foundry industry and supplemental codes, including those for miscellaneous sand, aluminum permanent mold, steel and rolling mill and blast furnace castings, were approved by the President Dec. 19, effective Dec. 25. The basic work week is 40 hours. Wage rates range from 32 cents an hour for males and 27 cents an hour for females in the South to 40 cents an hour for males and 35 cents an hour for females in the North.

Foreign

¶German ministry of economy, acting under legislation making formation of cartels compulsory, has ordered manufacturers of wire, wire nails and spring wire to associate themselves with already existing syndicates for the sale of these articles.

¶International tube cartel and Japanese manufacturers of tubes are reported by Commercial Attache Hunt, at Brussels, to have reached an agreement eliminating Japanese competition in the far eastern markets. European manufacturers of tubes agree not to sell in Japan, except certain qualities, while on the small exports quota allotted to the Japanese they agree to maintain cartel prices.

¶Japan, an increasing factor in the galvanized sheet trade in the Far East, exported 1,866,410 pieces in September, an increase of 266,629 pieces over August, according to the Japan Galvanized Iron Sheet Industrial Guild. September exports included 526,196 pieces to the Dutch Indies, 483,446 to Kwantung Province, 361,683 to China, 235,470 to Siam.

¶A leading engineering school in Moscow analyzes the class origin of its students as 76 per cent workers, 17 per cent employes and 7 per cent peasants. In 1914-15 the same school drew 35 per cent of its attendance from nobles and merchants,

32 per cent from the petty bourgeoisie, 19 per cent from officials and clericals and 14 per cent from landowners.

One important Czechoslovakian works having just received orders from Russia for 8700 tons of sheets and 6500 tons of rails and another company for 3500 tons of rails, the department of commerce in Washington deduces that Russia is shifting its iron and steel requirements from Germany. Terms of payment are 18 to 21 months.

Rates Texas Chromite High

A report by the Texas office of the United States bureau of mines on chromite ore deposits near Fredericksburg, Tex., gives the analysis as 50 per cent chromite, higher than similar ores of Russia, Turkey and New Caledonia, now supplying most of the requirements of the United States. Imports of chromite in 1932 totaled 100,000 tons; domestic production was 200 tons, all in California.

Call Meet on "F.I.T." Threat

Independent Steel Fabricators' Traffic association advises that a meeting will be held at Pittsburgh, Jan. 11 and 12, jointly with a committee of the American Institute of Steel Construction and commercial and traffic committees governing the administration of the steel code, for the purpose of discussing the recent threat to eliminate "fabricated in transit" clauses on iron and steel freight tariffs.

Truscon-Mitsui in Merger

Truscon Steel Co., Youngstown, O., Julius Kahn president, has amalgamated its steel business in Japan with the Mitsui Co. A program of expansion will be started soon and the united companies expect eventually to produce all forms of steel required in Japan.

Mr. Kahn, now enroute home from Japan, where he negotiated the deal, says there is no sign of depression in business in Japan.

Russia Mines More Iron Ore

Russian output of iron ore in September averaged 44,000 tons daily, an increase of 5.9 per cent over August and 34.4 per cent over September, 1932, according to the USSR chamber of commerce.

May Develop Stainless Plane

PWA may loan $500,000 for experimental development work on the flivver airplane of stainless steel described in "Windows of Washington," Dec. 25 issue of STEEL, page 15.

Here and There In Industry

WEIRTON STEEL CO., Weirton, W. Va., has moved its Philadelphia office from the Packard building to room 1462 Broad Street Station building, 1617 Pennsylvania boulevard.

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American Society for Testing Materials has moved its headquarters office to 260 South Broad street, Philadelphia.

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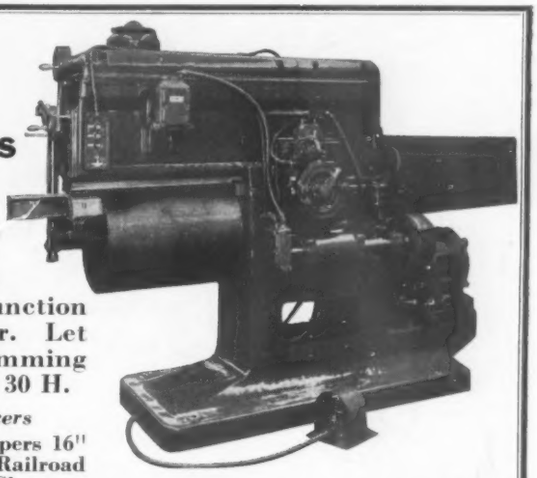
Offices of the Lake Superior Iron association, Cleveland, have been moved from the Corrigan, McKinney Steel Co.'s office building to 1170 Hanna building, Cleveland.

□ □ □

American Gear Manufacturers as-

MORTON Draw-Cut Flash Trimmers



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sociation has moved its headquarters offices from First National Bank building to the Penn-Lincoln hotel, Wilkinsburg, Pa. This is also headquarters of the code authority of the gear manufacturing industry.

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H. O. Swoboda Inc., Pittsburgh, has moved its office and laboratory to new and larger quarters at 4301 Main street. Greater facilities have been provided for research and development work in connection with industrial problems.

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Carborundum Co., Niagara Falls, N. Y., has moved its warehouse and district sales office at Cleveland from 1262 Ontario street to the Crown Annex building, 1150 West Third street. Larger facilities for handling increased stocks are available in the new location.

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Neptune Meter Co., Ltd. and National Meter Co. of Canada Ltd. have merged their interests under the name Neptune-National Meters Ltd., Toronto, Ont. Production will be carried on at the plant of the former, 345 Sorauren avenue, Toronto. J. Herbert Ballentine is president of the new company, John H. Ballentine vice president and secretary, and F. J. Bradley vice president.

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E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., has bought the metal degreasing business of the Carrier Engineering Corp., Newark, N. J. formerly conducted by the Carrier Metal Cleaning division. The sale includes patents, trademarks and goodwill of the Carrier vapor degreasing machine and the company's solvent. R. & H. chemical department of the du Pont company will continue manufacture of the solvent.

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Stanton Ironworks Co. Ltd., near Nottingham, Eng., has placed on the market a new 3-inch diameter spun iron pipe manufactured by the De-Lavaud process. It will be made in 12-foot lengths tested to 200 pounds per square inch, conforming to British standard specifications, except that it is ¼-inch thick and weighs 100 pounds per length. It is not intended to supplant the present heavier 3-inch pipe but is designed for users requiring a lighter pipe in cast iron.

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Chain Belt Co., Milwaukee, which recently installed a new type of automatic castings cleaner in its foundry, the development of the American Foundry Equipment Co., Mishawaka, Ind., has perfected an automatitc loading device for use with this unit and will manufacture it on a commercial scale. The cleaning unit replaces the standard tumbling barrel and sand blasting operations, throwing the abrasive against the castings by centrifugal force instead of compressed air.

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Surface Combustion Corp., Toledo, O., among recent installations has placed the following furnaces: Bethlehem Steel Co. a walking beam pair furnace for use with three-high mill at Sparrows Point, Md.; Granite City Steel Co., Granite City, Ill., a walking beam pair furnace for use before making tin plate breakdowns and two additional walking beam pack furnaces for finishing tin plate, for natural gas or oil firing; Continental Steel Corp., Kokomo, Ind., continuous walking beam pack furnace for heating sheet breakdowns, with oil gas firing system to use heavy fuel oil; Youngstown Sheet & Tube Co., Youngstown, O., a four-hole soaking pit, each hole 14 feet 6 inches by 6 feet 6 inches, one way fired, tile recuperators, for coke oven gas or its equivalent; American Can Co., New York, a controlled atmosphere continuous furnace for clean hardening of can openers.

□ □ □

Morse Chain Co., division of the Borg-Warner Corp., Ithaca, N. Y., and Detroit, has bought the Kelpo free-wheeling or one-way industrial

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clutch, a product of the Kelpo Clutch Co., Rockford, Ill. It will be manufactured at the Ithaca plant. Fred M. Potgeiter, former president of the Kelpo company, has joined the Morse organization.

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Hamilton Mfg. Co., Two Rivers, Wis., manufacturer of steel and wood printing house, laboratory and dental fixtures and equipment, has acquired a controlling interest in the Modernice Corp., manufacturer of beer cabinets and cooling equipment. It is starting production of these lines under its own name, using its own patents, and later intends to enter the general air conditioning field.

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Mahr Mfg. Co., Minneapolis, manufacturer of heating and heat treating equipment, has appointed George P. Dempler Co. Inc., 3318 Latonia avenue, Pittsburgh, its representative in western Pennsylvania, several counties in eastern Ohio and northern West Virginia.

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E. R. Wagner Mfg. Co., Milwaukee, manufacturer of hardware and metal stampings, has developed a transparent-top carpet sweeper and has brought production to 300 units per day, with further increase planned. A new distributing organization has been set up to market this product.

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Bristol Co., Waterbury, Conn., has formed Bristol Co. of Canada Ltd. to serve the Canadian market better and to expand its Canadian service laboratory of 12 years standing to include sales, service and manufacturing. Factory and general headquarters will be at 64 Princess street, Toronto, Ont. J. S. Mayberry, graduate engineer of Toronto university and for ten years with the parent company, has been appointed manager.

Personals

EDWIN S. MILLS, vice president and general sales manager, Illinois Steel Co., Chicago, has resigned. Born in New Brighton, Pa., he received his education in Cleveland public schools and entered the employ of the Carnegie Steel Co. in that city in 1895. He became manager of sales and later was appointed general manager of the Pittsburgh Steamship Co.

Subsequently he became agent of the Oliver Iron Mining Co., Duluth, and, following final organization of the United States Steel Corp., was transferred to New York as assistant to the first vice president. From 1910 to 1919 he served as sales manager for the Carnegie Steel Co. at Chicago. He then was appointed general manager of sales for the Illinois company and in 1926 was made a vice president in addition to his other duties. Mr. Mills also is manager of sales in the Chicago district for the Carnegie company and Tennessee Coal, Iron & Railroad Co. He is a member of the board of trustees of Northwestern university, Evanston, Ill.

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W. E. Richey, Chicago district manager for Luria Bros. & Co. Inc., scrap dealer, is now recovering from a recent serious illness.

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G. Furman Mather, associated with Frank Samuel & Co. Inc., Philadelphia, on Jan. 1 will join the Philadelphia organization of Charles Dreifus Co.

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Willard McFadden is now the district sales manager at Chicago, with offices in the Peoples Gas building, for West Leechburg Steel Co., Pittsburgh. He formerly was district sales manager for the company in Detroit and has succeeded to the post at Chicago left vacant by L. W. Briggs, now general sales manager for the West Leechburg company.

□ □ □

F. P. Harrigan has been appointed sales representative in the New York metropolitan area for the Sheffield

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REDUCTION GEAR SET
MILL MOTORS **FLOOR PLATE**
SPEED and RUNABOUT TABLES
HOT BEDS **LADLES** **COILERS**
LOCOMOTIVES:
Steam, Gasoline and Electric
LADLE CARS **ROLL LATHES**
DIE MAKING and TOOL ROOM EQUIPMENT
MACHINE TOOLS **PLATE SHEARS**
BENDING ROLLS:
Plate and Angles
PLATE PLANERS **WELDERS**
BENDING BRAKES **RIVETERS**
SHEARS:
Billet and Bloom
FORGING MACHINES or UPSETTERS
HAMMERS:
Board Drop, Steam Drop, Steam Forging
TIMING PRESSES
HOT SAWS and BURRING MACHINES
SAND BLAST EQUIPMENT
PRESSES:
Mechanical and Hydraulic, Single and Double Action
SWAGERS **GRINDERS** **NIBBLERS**
BULLDOZERS **STEEL BUILDINGS**
TESTING EQUIPMENT:
Riehle, Olsen, Southwark
LABORATORY EQUIPMENT

Manufacturing RITTERBUSH & COMPANY, INC. *Equipment*
30 CHURCH ST.
NEW YORK CITY

Machine & Tool Co., Dayton, O., with offices at 30 Church street, New York.

□ □ □

Gardner C. Derry, who has been sales manager of the power division of the B. F. Sturtevant Co., Boston, has been elected vice president of the company.

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Walter Harnischfeger, president, Harnischfeger Corp., Milwaukee, has returned from a month's tour of Europe, where he visited industrial plants in Belgium, France and Germany.

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Joe McNally, formerly associated with the Railway Car & Equipment Co., Chicago Steel Car Co. and the General American Tank Car Corp., all of Chicago, is now connected with Iron & Steel Products Inc., Railway Exchange building, Chicago, dealer in railway supplies.

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H. J. Crichton has been appointed supervisor of purchases for General Motors Truck Corp., Detroit.

Col. G. A. Green has been named a member of the executive staff of the corporation and will devote his efforts to field research and study in connection with design and manufacturing operations.

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L. A. Umanski, specialist in steel mill equipment, associated with the General Electric Co., Schenectady, N. Y., and who has recently spent three years as a consulting engineer in Russia, addressed a meeting of the Association of Iron and Steel Electrical Engineers, Dec. 15, at the William Penn hotel, Pittsburgh.

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Colin G. Fink, professor of electrochemistry, Columbia university, New York, and secretary of the Electrochemical society, will receive the Perkin medal of the Society of Chemical Industry at a meeting to be held in the Chemists' club, New York, Jan. 5. The medal is being awarded Dr. Fink for his inventions in the fields of metallurgy and electrochemistry.

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William K. Stamets, president, William K. Stamets Co., Pittsburgh, was elected president of the Machine Tool Club of Pittsburgh at its initial meeting recently.

George M. Cherrington was elected vice president and G. M. Harrower was named secretary and treasurer.

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George Disque has resigned as a Detroit sales representative of the Crucible Steel Co. of America and the Halcomb Steel Co. He first was associated with the latter organization in 1909 at its Syracuse, N. Y., plant, and since 1918 has been in Detroit. When the Crucible company consolidated with the Halcomb company two years ago, he continued his work at Detroit with the merged organization.

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Theodore M. Gloeckner, associated with the sales organization of Union Drawn Steel Co., Massillon, O., for more than 15 years, became district sales manager for the Philadelphia territory, Jan. 1. He has spent the greater part of these years in the Philadelphia office of the company, 2030 Fidelity-Philadelphia Trust building, and for the past 18 months has been in charge. He is well-known among users of cold-finished steel.

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Karl Kautz, who as noted in STEEL for Dec. 25 has joined the staff of the Republic Steel Corp., Massillon, O., as ceramic engineer specializing in research and field service on enameling sheets, is a graduate of Ohio State university, Columbus, O., and has had ten years of experience in various branches of vitreous enameling work. For two years he was in charge of the enameling plant of American Range & Foundry Co, East St. Louis, Ill., following which he was associated successively with the Northwestern Terra Cotta Co., St. Louis, and the Abingdon Sanitary Mfg. Co., Abingdon, Ill., as ceramic chemist.

Edwin S. Mills

Died:

FRANK L. NORTON, 64, vice president, Scullin Steel Co., St. Louis, at his office in New York, Dec. 21. He had been associated with the company for 32 years, starting in the sales department at St. Louis.

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Willard D. Ackley, 64, president and general manager, Union Fork & Hoe Co., Frankfort, N. Y., Dec. 24.

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Everett Morss, 68, president, Simplex Wire & Cable Co., Boston, at his home in that city, Dec. 27.

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Robert A. Gillespie, 69, president, Gillespie Machine Co., Pittsburgh, in that city recently.

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Josiah Judd, 61, for many years president of the Wire Machinery Co., Fair Haven, Conn., in New Haven, Conn., Dec. 19.

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Charles Stolper, 61, founder and president of the Stolper Steel Products Co., Milwaukee, at his winter home in Coral Gables, Fla., Dec. 25.

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Charles W. Holt, 74, founder and president of the Holt Electric Motor Co., Milwaukee, at his home in Wauwatosa, Wis., Dec. 22.

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Robert A. Bautz, 66, Chicago metallurgist, in Chicago, Dec. 13. He was a member of the American Ceramic society and the American Institute of Mining and Metallurgical Engineers.

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Harry Ward Randolph, 69, founder and president of the Ohio Knife Co., Cincinnati, in that city, Dec. 25. A native of Paton, Ill., he was formerly manager of the Anderson Knife & Bar Co., Anderson, Ind.

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Thomas Finigan, 51, executive vice president, American Brake Shoe & Foundry Co., Chicago, Dec. 25. He was in charge of all western operations of the company.

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William Shelton, 80, pioneer in the sheet steel industry in the Apollo, Pa., district, recently, in Pittsburgh. From 1868 until 1900, when he retired, he was at various times connected with three of the pioneer mills in the sheet industry in western Pennsylvania.

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Anthony Waldeck, 82, founder of the A. Waldeck Mfg. Co., Cleveland, at his home in that city, Dec. 25. He had been active for 36 years in the wire gage business until nine years ago, when he retired. Three of his brothers, Joseph, Charles and John, were executives of the American Steel & Wire Co.

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A. E. Hammitt, 79, long associated with American Sheet & Tin Plate Co., Pittsburgh, and for many years superintendent of the company's galvanizing division at its Vandergrift, Pa., works, at Miami, Fla., recently. He had been in Miami for the past three months because of ill health but previously had been a resident of Apollo, Pa., for over 50 years.